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ENVIRONMENTAL ASSESSMENT BOARD



ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 27

DATE: Wednesday, June 12, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS Chairman

DR. G. CONNELL Member

MS. G. PATTERSON Member

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act,
R.S.O. 1980, c. 140, as amended, and Regulations
thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro
consisting of a program in respect of activities
associated with meeting future electricity
requirements in Ontario.

Held on the 5th Floor, 2200
Yonge Street, Toronto, Ontario,
on Wednesday, the 12th day of June,
1991, commencing at 10:00 a.m.

VOLUME 27

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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MR. R. NUNN	Counsel/Manager, Informations Systems
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M. IZZARD)	ASSOCIATON, INTERNATIONAL INSTITUTE OF CONCERN FOR PUBLIC HEALTH
J. PASSMORE)	SESCI
G. GRENVILLE-WOOD)	

A P P E A R A N C E S
(Cont'd)

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1 --Upon resuming at 10:03 a.m.

2 THE REGISTRAR: This hearing is now in
3 session. Please be seated.

4 THE CHAIRMAN: Mrs. Mackesy.

5 RONALD TABOREK,
6 DAVID BARRIE,
7 JOHN KENNETH SNELSON,
8 JUDITH RYAN; Resumed

9 CROSS-EXAMINATION BY MRS. MACKESY:

10 Q. Could we turn to page 4 of my
11 interrogatory package. This is interrogatory response
12 2.29.6. This interrogatory distinguishes between the
13 transmission system described under .1 and the
14 distribution system described under .2, and it
15 indicates that the -- perhaps I should ask this
16 question. The distribution system is what is called
17 the retail delivery system in this response; is that
correct?

18 MR. BARRIE: A. That's correct.

19 Q. Thank you.

20 Under .1, the transmission system is
21 divided into two sections, the bulk transmission
22 component and the regional supply component. Could you
23 briefly describe the difference between the two for the
24 record, please.

25 A. It is probably best described by

1 looking at the function of the two kinds.

2 The bulk transmission, its function is
3 bulk transfer of power from the major generating
4 stations to the major load centres, or to the vicinity
5 of the major load centres, would be a better way of
6 putting it.

7 The regional supply component, the
8 function of that system is to take power from the bulk
9 transmission and feed it to the distribution. So, it's
10 the interface between the bulk transmission and the
11 distribution system.

12 Q. The bulk transmission component is
13 made up of lines at the 500 kV, the 345 and the 230 kV
14 levels?

15 A. Yes.

16 Q. Now, are the radial lines, for which
17 approval is being requested at this hearing, additions
18 to the bulk transmission component, the 500 kV lines?

19 MR. SNELSON: A. The transmission for
20 which approval in principle is being sought in this
21 process is radial transmission for the incorporation of
22 new generating stations and the transmission associated
23 with the Manitoba purchase, and both of those will
24 generally be part of the bulk power system.

25 Q. But any lines that are the 500 kV

1 level in that would be part of the bulk transmission?

2 A. Yes.

3 MR. BARRIE: A. Yes.

4 Q. That would apply to 230s as well?

5 A. Yes.

6 Q. Now, turning to page 7 of the
7 interrogatory package, this is interrogatory response
8 2.29.8, and this describes the upgrading and
9 refurbishment of transmission. Is this what the annual
10 100-million a year expenditure that you described
11 earlier in your testimony covers?

12 A. Refurbishment?

13 Q. Yes.

14 A. Yes.

15 Q. That covers both refurbishment and
16 upgrading? Both those terms were mentioned in Exhibit
17 3 of the DSP on page 401 and it was an explanation of
18 those terms that I was requesting in this
19 interrogatory.

20 A. The figure I have been quoting of
21 \$100-million, in excess of \$100-million, is
22 refurbishment and what we called rehabilitation of
23 station equipment. I am not sure that it includes what
24 is included here as upgrading. I don't think it does.

25 Q. Okay. I am not clear then. Did it

1 include the refurbishment of lines?

2 A. Yes.

3 Q. It did, I see. All right.

4 This interrogatory doesn't mention the
5 improvements to the transformer stations?

6 A. Right.

7 Q. Could you briefly describe what is
8 meant by each of the upgrading procedures listed in
9 Interrogatory 2.29.8? It mentions retensioning of the
10 conductors, raising towers, reconductoring with larger
11 size conductors and rebuilding the line for operation
12 at a higher voltage.

13 What does retensioning the conductors
14 mean for someone who isn't familiar with this
15 technology?

16 A. Over a period of time the conductors
17 of the transmission line, as they age --

18 Q. These are the wires on the line?

19 A. Sorry, the actual wires.

20 Q. Yes?

21 A. Yes. Over a period of time as they
22 age will tend to sag. Retensioning means that -- well,
23 essentially they are being pulled tighter if you will,
24 so that there is less sag. Is that okay for retension?

25 Q. Yes. And raising the towers, what is

1 involved in that?

2 A. Physically increasing the height of
3 an existing tower or building a new tower immediately
4 next to it to raise, again it's going to raise the
5 minimum sag of the line.

6 One of the critical factors in any
7 transmission line is the maximum sag. The minimum
8 height above ground that occurs midway between two
9 transmission towers. So, both retensioning and raising
10 the tower really has the same effect of raising that
11 minimum clearance between the point of maximum sag and
12 the ground.

13 Q. Reconductoring with larger size
14 conductors, does that imply changing a 230 to 500?

15 A. No, that's the last one.

16 Q. That's rebuilding, okay?

17 A. The third one reconductoring means
18 you have it at the same voltage, but the actual
19 conductors are removed because they have either
20 deteriorated through time or have, just simply, more
21 ampacity.

22 The ability to carry more current is
23 required, so that will mean putting in larger
24 conductors, but operating at the same voltage. So,
25 you're basically improving the power transfer

1 capability of the line.

2 Q. So, you can get more power out over
3 those lines to wherever?

4 A. Yes, at the same voltage but with the
5 same towers. Now, The fourth one --

6 Q. You were mentioning that you weren't
7 sure whether upgrading is included in that \$100-million
8 plus per year. Is it included in the annual, regular
9 maintenance that Ontario Hydro would do?

10 A. No. Things like reconductoring and
11 rebuilding lines would be done on an individual project
12 basis. So that would not be included in an annual OM&A
13 figure. These latter ones are major projects. These
14 are not minor maintenance activities.

15 Q. I got the impression from reading
16 page 4.1 of Exhibit 3 that Hydro intends to go through
17 with these projects.

18 A. Could I just check the reference?

19 Q. Yes. It's page 4.1, columns 1 and 2.
20 This is at the bottom of the page of column 1 the
21 Demand/Supply Plan strategy gives a high priority to
22 the maintenance, upgrading, and refurbishment of
23 existing generation and transmission facilities to
24 improve their performance, efficiency, reliability and
25 environmental acceptability.

1 A. What I could perhaps tell you is what
2 is involved in refurbishment and then you will see what
3 wasn't included.

4 Q. I suppose I am more concerned about
5 how the upgrading that is mentioned here is going to be
6 done. Is that something that -- maybe I am not putting
7 it well. Is that something that depends on the
8 approval of this plan or is that something you would
9 normally would do outside this plan?

10 A. What I have been talking about is the
11 upgrading of existing facilities and really the
12 maintenance of the standards of performance which I
13 don't think are a matter being discussed in this
14 undertaking.

15 Q. Do you know whether Ontario Hydro has
16 plans to do that?

17 MR. SNELSON: A. Ontario Hydro has
18 plans, as necessary from time to time, to make
19 improvements to existing transmission facilities and
20 they are dealt with as separate plans in our planning
21 process. Now, our transmission experts will be on
22 Panel 7 and it's clear to me that we are not seeking
23 approval through this process for transmission other
24 than the ones that I mentioned in terms of radial
25 connection and new generation and the Manitoba

1 purchase.

2 Each transmission project that is outside
3 of that will have its own planning process and
4 approvals, as appropriate. I am not familiar with how
5 large a transmission project has to be to have its own
6 environmental assessment and what is covered by class
7 environmental assessments or other assessment
8 processes, but they will all have there approval
9 processes as appropriate to what is being proposed.

10 Q. What I am trying to do is relate the
11 upgrading, as Mr. Barrie has described it today, to
12 what has been said before, in the course of evidence on
13 this panel, as to improving transmission. This is
14 something new, then, in addition. We haven't heard
15 about that before?

16 If this were done would this improve the
17 transmission beyond the level that you have spoken of
18 so far on this panel?

19 A. The position on transmission is that
20 we will provide a transmission system that is adequate
21 for the generation and the improvement of the existing
22 transmission facilities and the maintenance of existing
23 transmission facilities is a part of the process of
24 providing a transmission system that will be adequate
25 for the generation.

1 Q. Could I go back to Mr. Barrie. Is
2 this something in addition to what you have been
3 talking about up to this point?

4 MR. BARRIE: A. Is what in addition?

5 Q. The upgrading procedures that you
6 mentioned today, which apparently are not included in
7 the 100-million annual?

8 A. I think one has to make a clear
9 distinction of what the references have been in the
10 past. This transmission refurbishment which means
11 bringing transmission equipment back up to a reasonable
12 level of performance, because of the concerns we have
13 had about poor transmission performance.

14 There is upgrading the equipment, things
15 like reconductoring. That wasn't included in
16 refurbishment.

17 Q. You are saying that this would
18 improve the transmission capability if that were done?

19 A. It would.

20 Q. Yes.

21 A. But, I think what we have been
22 driving at, in terms of transmission limitations, the
23 limitations transmission puts upon us, the resolution
24 of that is from new transmission equipment, over and
25 above what I have talked about. And I haven't

1 addressed any of that.

2 The transmission experts will be coming
3 on on Panel 7, as Mr. Snelson mentioned, but any new
4 major transmission additions, such as the one that just
5 occurred last year when we put the extra double circuit
6 line out at Bruce, that is a brand new capital
7 addition. That wouldn't be included anywhere under
8 refurbishments or upgrading.

9 Q. No.

10 A. That's the way major transmission
11 limitations are resolved.

12 Q. You have transmission limits. If you
13 were to carry out some of these procedures on existing
14 lines would those limits then be reduced somewhat,
15 depending on the line and what you did?

16 A. I think it would have little impact
17 on the list of limits that I gave previously.

18 Q. It would have little impact on the
19 list, but, would it reduce the amount of limit in a
20 particular case?

21 A. It may effect the number of times
22 that a limit actually caused us to change operation,
23 yes. But I don't see a substantial shift in that.
24 Only new transmission makes fundamental changes in the
25 limits that affect our operation.

1 Q. If I wanted more details on this
2 should I go to Panel 7?

3 A. I think that would be best, from a
4 planning perspective, if you want to know new
5 transmission facilities coming on in the next few
6 years.

7 Q. If I want to know exactly what
8 upgrading would do on a particular line?

9 A. Upgrading would be something that
10 Panel 7 would cover as well, yes.

11 Q. Thank you.

12 Now, if we turn to page 9 of my
13 interrogatory package, please. This is part of
14 interrogatory response 2.14.18.

15 I am confused about the requirements for
16 both load and generation rejection at the Bruce Nuclear
17 Power Development. The evidence given in Volume 20 on
18 page 3432, is that the Bruce load and generation
19 rejection scheme will be required indefinitely, and
20 that's on lines 1 to 3, on the top of the page.

21 A. That's correct.

22 Q. Now, the second last paragraph on
23 page 9 reads that:

24 "With the new Bruce-to-London line in
25 service, locked-in nuclear generation at

1 Bruce is expected to be minimal,
2 occurring primarily during the
3 transmission outages or during heavy
4 transfers from Michigan"?

5 A. That's correct.

6 Q. But that:

7 "The use of a special projection
8 scheme utilizing load and generation
9 rejection is still required to fully
10 unlock the output of the Bruce complex."

11 Going on to the last paragraph on page 9 it reads:

12 "The second stage of the southwestern
13 Ontario expansion plan, which includes a
14 new 500 kV transmission line from
15 Longwood GS to Nanticoke GS, will be
16 placed in service in August 1991. With
17 this addition to the transmission system,
18 the automatic rejection of customer load
19 will not be required to fully unlock the
20 output of the Bruce complex."

21 Now, I am confused. What is the
22 situation with regard to load rejection at BNPD after
23 that London-to-Nanticoke line comes into service.

24 A. The situation, as it exists now,
25 there is no generation bottled at Bruce, but, we are

1 required to use both generation and load rejection in
2 order for that to be the case.

3 Q. Yes. I got the impression from this
4 paragraph at the bottom that there would be some change
5 with regard to the status of the load rejection after
6 the London-to-Nanticoke line comes in, and I am not
7 clear about that.

8 A. Right. Perhaps I should recap the
9 fundamental principles of the generation and load
10 rejection scheme and then you can see why the load
11 rejection part is no longer necessary. If we reject
12 more than 1500 megawatts of generation at Bruce, we
13 must also reject customer load to prevent the in-rush
14 from the interconnections being excessive.

15 So, if, at the moment we have to reject
16 either three units or four units at Bruce, this would
17 be more than 1500 megawatts, we would be in that
18 situation. The addition of this extra line here will
19 mean that we will be able to get away with only two
20 unit rejection at Bruce, 1500 megawatts, which means
21 the requirement for load rejection will no longer
22 exist.

23 Q. Does that contradict what you said on
24 page 3432 that the Bruce load and generation rejection
25 scheme will be required indefinitely?

1 A. No. The generation rejection will be
2 a normal day to day thing. The load rejection portion
3 would only be utilized when we have a transmission
4 outage. We don't take a scheme out of operation when
5 it may be needed for an outage. So, perhaps, on most
6 days of the year the load rejection scheme will -- we
7 call it being armed, it would not be armed, it would
8 not be actually functioning, but it would be ready to
9 be available to be used if we had to take a
10 transmission out for maintenance purposes.

11 Q. I see.

12 A. So, it would only be used, I think
13 that was said elsewhere in evidence, that it would
14 primarily be used during times of transmission outages.

15 So, the generation rejection portion
16 would still be in place, the load rejection portion
17 would only be in place when there is a transmission
18 outage.

19 Q. I am not sure that I understand that
20 clearly. Could I ask more questions on that in Panel
21 7?

22 A. I don't think you will get any better
23 explanation. There is not one that I honestly boot off
24 to Panel 7.

25 Q. Now, going on to page 10 of the

1 package. I am reading from the first paragraph at the
2 top of the page:

3 "It was planned to provide automatic
4 generation runback on the Bruce units
5 scheduled for June 1993 in-service to
6 alleviate the voltage stability
7 considerations required during generation
8 rejection. System studies are being
9 carried out to assess the necessary
10 additional facilities such as series
11 compensation in southwestern Ontario to
12 meet future system requirements."

13 What do you mean by automatic generation
14 runback on the units?

15 A. At present we use generation
16 rejection, automatic generation rejection. That means
17 an instantaneous rejection. We open the circuit
18 breaker and the generation goes from whatever load it's
19 doing - it could be full load - to zero.

20 This is a refinement on that which will
21 allow the generation to run back, that means the output
22 would be steadily reduced over a period of a few
23 minutes, to get the same effect as the generation
24 rejection, but it has one big advantage, in that the
25 machine stays connected to the system and can help

1 maintain voltage levels. So, you would reduce the
2 megawatts but you would keep the machine on line to
3 assist in maintaining voltage.

4 One of the problems we have is when we
5 carry out this kind of operation, we have very low
6 voltage levels occur at key places on the same. In
7 fact, some of our limits are based on minimum voltage
8 levels.

9 So, this will be a refinement which will
10 get over that particular problem. We haven't got it
11 yet, but it's expected in 1993.

12 Q. Could I just try one more question
13 about what I was asking about before about with the
14 load and generation rejection after the
15 London-to-Nanticoke line comes in. I believe you said
16 that after that have line comes, instead of rejecting
17 three or four units, you will be rejecting two units?

18 A. Yes.

19 Q. So that means there is less
20 generation rejection once that line comes in?

21 A. Yes.

22 Q. So that means once that line comes in
23 your getting more power out of the lines that are still
24 in service?

25 A. No.

1 Q. No. Oh.

2 A. We still get the same generation out.

3 It is just when a fault occurs, we only have to reject
4 two units instead of three or four units.

5 Q. So the steady state, before the fault
6 situation, is still the same. There is still no
7 bottled energy at Bruce. We are still getting
8 everything out. It's after the fault that you are in a
9 better position.

10 Q. That's what I meant.

11 A. That's right.

12 Q. You don't have as much locked-in
13 energy after the fault once the London-to-Nanticoke
14 line --

15 A. After the fault.

16 Q. Yes.

17 Q. Now, lower down on the page there is
18 the table of locked-in energy figures at BNPD, and
19 these figures apply to the situation before the
20 Bruce-to-London line was in-service and before the
21 London-to-Nanticoke line will be in service; is that
22 correct?

23 A. That's right.

24 Q. Is this amount of locked-in energy a
25 real figure or a theoretical figure? By that I mean,

1 were there nuclear units that would have been
2 generating electricity if the new line had been built
3 earlier, or do these locked-in energy figures contain
4 theoretical production from units that were actually
5 out of service because of a forced plan or maintenance
6 outages at the Bruce stations?

7 A. They represent real locked-in energy.

8 If we have units out for any other reason, planned,
9 forced, whatever, they would not be put into the
10 calculation.

11 Q. Okay. Now, interrogatory responses
12 in the package, pages 11 to 14, are replies to
13 Interrogatories 2.29.18, through 2.29.21.

14 I would like to ask some questions about
15 transmission limits and geographic balance and I don't
16 know who to direct these questions to. I will just ask
17 the question and the appropriate person can answer.

18 In 2.29.18 on page 11, I asked: "Does
19 the problem with transmission limits arise because some
20 generating plants have not been built locally where the
21 need is for electricity"?

22 And the reply began: "A transmission
23 limit occurs when there is not enough transmission to
24 allow the sharing of the resources between areas." And
25 it goes on to explain why sharing is required and the

1 need for extra generation capacity.

2 If each area were to be totally
3 self-sufficient and the financial benefits of larger
4 stations in sharing generation resources among
5 different parts of the province, is that a fair summary
6 of the response?

7 A. Yes, I think so.

8 Q. Is the FETT situation, the Flow East
9 Towards Toronto, is that an example of a transmission
10 limit?

11 A. Yes.

12 Q. Now, despite the answer to this
13 interrogatory, is the underlying reason that the
14 problem can arised with limits, the fact that the local
15 areas don't generate enough electricity themselves to
16 cover their peak needs?

17 A. I think the answer is a fair answer,
18 first of all.

19 Q. The answer that you have given us is
20 a fair answer, yes.

21 A. Right.

22 Q. Okay.

23 A. I think your point that if you built
24 generation immediately where it's required, that
25 transmission limits would not arise and you would need

1 less transmission, is valid, and I think we agreed to
2 that last time. It's one of a number of
3 considerations, though, in where there is site
4 generation.

5 Q. Going on from that, and leaving out
6 the remote system in the north, does the existing
7 system of transmission lines provide the province with
8 a base for security against the circumstances that you
9 describe as giving rise to transmission limits, such as
10 outages to equipment, shifts in load growth patterns,
11 and delays in approval in construction of transmission
12 reinforcements?

13 A. I think the present transmission
14 system does give us that basis with the exceptions that
15 we have listed in interrogatories which show the
16 principal interfaces where problems have occurred.

17 Q. That was listed in Interrogatory
18 2.24.10, I think. I don't have that with me.

19 A. We have done it in a number of
20 interrogatories.

21 Q. That was the one which listed 16
22 schemes?

23 A. There is a better one than that.

24 Q. Could you give me the number of that
25 then, please?

1 A. 2.24.9.

2 Q. 2.24.9.

3 A. I think we must make a distinction.

4 The number that you quoted, the one with the 16, that
5 lists the special protection schemes. So, special
6 protection scheme is where we have a scheme trying to
7 get a bit more out of the transmission limit. It isn't
8 really a good way to look at transmission limits. It's
9 best to go and actually look at the limits. That's why
10 I would rather refer you to 2.24.9.

11 There is a relationship. Special
12 protection schemes are often related to transmission
13 limits. But there may be a transmission limit that
14 didn't have a a special protection scheme associated
15 with it. That's why I am referring you to the other
16 one.

17 Q. Thank you. In 2014 will there still
18 be a substantial base in place taking into account the
19 existing system as it is today, the rehabilitation you
20 plan to do and the new lines which you intend to have
21 in place by the year 2000 as described in Exhibit 6 on
22 page 5-3?

23 A. Could I look at the reference?

24 Q. Exhibit 6 is the plan analysis. It's
25 figure 5.1.

1 THE CHAIRMAN: What page is it you are
2 looking at?

3 MRS. MACKESY: 5-3, Exhibit 6.

4 MR. BARRIE: I'm sorry, could you ask me
5 the question again?

6 MRS. MACKESY: Q. Yes. In 2014 will
7 there still be a substantial transmission base in place
8 taking into account the existing system today, the
9 rehabilitation that you plan to do and the new lines
10 which you intend to have in service by 2000 as
11 described on page 5-3?

12 MR. BARRIE: A. I think this one really
13 is better dealt with in Panel 7. It's very much a
14 planning issue.

15 The plans that I have seen in place up to
16 the year 2000 would certainly continue to give us that
17 basis, but I couldn't speak beyond that.

18 Q. Okay. Thank you.

19 In Interrogatory 2.29.19, which is on
20 page 12 of my package, I asked: What considerations go
21 into the statement that adding generation to a system
22 to solve the problem of transmission limits is often
23 not the best course of action.

24 Is it fair to say that the reply stresses
25 the importance of financial costs in arriving at a

1 decision not to add more generation?

2 MR. SNELSON: A. If you just let me read
3 the response.

4 The answer certainly discusses the cost
5 aspects of adding generation versus transmission.
6 There would also be environmental and other aspects
7 that would be taken into account in those sorts of
8 decisions, and it may be that the environmental
9 decision would be similar to the economic decision.

10 Q. In a particular situation?

11 A. In a particular situation.

12 Q. In Interrogatories 2.29.20 and
13 2.29.21, on pages 13 and 14, I asked about good
14 geographical balance. Could you give me a definition
15 of what you mean by good geographical balance?

16 A. I don't think I can give you a
17 precise definition.

18 It is a rough balance between
19 transmission and load in broad areas of the province.
20 This becomes a significant factor in choosing the
21 siting of major generating plants.

22 In situations where we don't have a good
23 geographical balance, then you tend to see increased
24 amounts of bulk transmission over situations when we
25 have achieved a reasonable balance. This is a crucial

1 factor in choosing sites, and this is one area where
2 transmission and generation interact significantly in
3 the siting part of the process.

4 Q. Thinking back to the earlier comment
5 about the concentration of generation at Bruce during
6 the 1985 Barrie tornado, is that an example of poor
7 geographical balance.

8 A. Possibly to some degree, but tornados
9 and such incidents that affect the transmission system
10 tend to have major impacts and transmission systems can
11 only be designed to give a limited degree of protection
12 to those sorts of incidents.

13 Q. So, a better type of protection would
14 be to build the generation closer to the area of need?

15 A. You would have to balance that
16 against all the other factors that come into siting of
17 generation.

18 Q. Now, Interrogatories 2.29.2 and
19 2.29.13 through 2.29.15 on pages 15 to 18 of my package
20 relate to exports. Last week I believe that someone
21 said that a 500 kV line from the Longwood transformer
22 station in the London area, west to the Michigan border
23 would make imports of U.S.-generated electricity
24 easier; is that correct?

25 MR. BARRIE: A. It removes one of the

1 internal limits that often affect our ability to make
2 major imports or exports to Michigan. So, to that
3 extent, yes.

4 Q. My next question was, would that line
5 make exports of nuclear energy from Ontario to the U.S.
6 easier. I gather from what you have just said it
7 would; is that correct?

8 A. In a very specific set of
9 circumstances, yes. If, right now, we wanted to sell
10 nuclear energy to the United States, specifically to
11 Michigan, and a limit was preventing us, then this line
12 would. But that isn't actually the case.

13 Our present position is if we were going
14 to be selling, we would be selling to New York, and
15 this particular line wouldn't help.

16 But the general observation I made
17 earlier is still true, it does assist in our
18 transactions with Michigan.

19 Q. And with the Bruce-to-London double
20 circuit 500 kV transmission line now in service, does
21 that make it easier to make nuclear energy sales to the
22 U.S.?

23 A. Anything that improves our capability
24 to get the nuclear generation out, does improve the
25 situation.

1 Q. So that means that line would.

2 A. Well, only in that context. I don't
3 want to leave the impression that because we have built
4 this line we suddenly have these huge opportunities to
5 make nuclear sales.

6 MR. SNELSON: A. The other factor which
7 should be taken into account is that we always use
8 the lowest cost generation in terms of incremental
9 production cost to meet the Ontario requirements first.
10 And so, the occasions when we have any surplus nuclear
11 energy to sell, we have that energy available, are
12 really quite limited, and they occur mostly on an
13 occasional nighttime or weekend. It's not a regular
14 occurrence that we have nuclear energy for sale.

15 Q. Okay. In Interrogatory 2.29.2, I
16 asked where there was a forecast for exports, and I am
17 not going to go into that now. But, in the last line
18 of the response, it mentions in the case of medium load
19 growth the sales of surplus nuclear power would be less
20 than one per cent of the annual Ontario electricity
21 demand. I am wondering if you could give me some sort
22 of megawatt figure as to what one per cent of Ontario
23 annual electricity demand would represent?

24 MR. BARRIE: A. Right now it would
25 represent say 1.5 terawatthours.

1 Q. And that's in megawatthours.

2 A. Terawatthours.

3 Q. Terawatthours, I'm sorry.

4 Is there an easy way to convert that to a
5 terawatt figure?

6 A. A terawatt, it's 10 to the 6th
7 megawatts. It's a million megawatts.

8 MR. SNELSON: Are you converting it to a
9 measure of power?

10 Q. Yes.

11 A. Such as megawatts or terawatts
12 instead of terawatthours?

13 Q. That's really what I want.

14 MR. BARRIE: A. This is energy.

15 Q. This is energy that you have got
16 here.

17 A. We measure how much we sell by the
18 energy we sell. So, the figure I have given you is an
19 energy measurement, so many megawatthours. I don't --

20 Q. If you are producing that over a year
21 and you had just one facility producing that, how large
22 would that facility have to be to reduce that?

23 A. Well, If you divide by the number of
24 hours in a year, which is 8,760, you would get the
25 answer.

...

1 [9:45 a.m.] Q. Is this just a straight conversion
2 from --

3 A. Yes. It is just multiplying the
4 megawatts by the number of hours that you are
5 supplying.

6 Q. Okay. All right.

7 A. It wouldn't happen that way, by the
8 way.

9 Q. No. I understand that.

10 A. The way it would happen would be, as
11 Mr. Snelson described it, if we were selling nuclear,
12 it would be usually at very light load periods at
13 night, at weekends, and normally around this time of
14 year or the past month or two, when we have lots of
15 hydraulic energy available.

16 Q. With regards to Interrogatories
17 2.29.13 and 2.29.15, in 2.29.13 I asked if, at present,
18 Ontario Hydro does not have contracts for major firm
19 sales to other utilities. And in 2.29.15 I asked, is
20 Ontario Hydro interested in or under pressure to make
21 major firm sales to other utilities.

22 The reply to the first one was that
23 Ontario Hydro has no contracts for major long-term firm
24 sales to other utilities. And the reply to the second
25 was that Ontario Hydro was not interested in making or

1 under pressure to make major firm sales to other
2 utilities.

3 Can you give me an idea of what size of
4 sale you were thinking of when you were using the term
5 "major"?

6 A. I think we gave an example of one
7 that we felt was not major.

8 Q. Yes?

9 A. The one in Vermont. Vermont, this
10 contract is up to 100 megawatts. 112, I think, is the
11 actual number.

12 Q. Okay.

13 A. But we currently are only delivering
14 about 17. So, that is the kind of thing that we would
15 consider to be not significant.

16 Q. The 17 or the --

17 A. Well, even 100.

18 Q. Okay.

19 A. Because it's not over a very long
20 time, as well. I think those are two things that
21 would define "major," the amount of megawatts involved
22 and the time for which the contract has been struck.
23 This one expires in 1992.

24 Q. Do you have any bottom line for major
25 then?

1 A. I don't think so. I think we used
2 major to cover both of those parameters.

3 Q. Okay. I just want to look at a
4 transcript reference before going on to the next
5 question. Okay. This refers to Volume 22, page 3777.

6 And this was a question from Mr. Shepherd
7 saying:

8 "I would like to turn now to the area
9 of reliability. Just come back right to
10 the very basic principles. As I
11 understand the DSP, the two really
12 driving forces behind Hydro's planning
13 and, indeed, all of your operational
14 decision-making are cost and reliability,
15 and I understand that there are a lot of
16 other things as well, but those are the
17 two main ones; right?

18 And the answer was:

19 "I think that you cannot ignore the
20 other factors, the other factors such as
21 environmental acceptability and social
22 acceptability are, to some extent, more
23 important than the other two factors."

24 And now my question carries on from that.
25 Have the continued mothballing of Hearn and the limited

1 operation of Lakeview been, in part, to some extent
2 been based on lack of social acceptability in the local
3 communities and not only on technical and economic
4 reasons?

5 MR. SNELSON: A. I think that that is a
6 case where, with respect to Hearn, the units were
7 closed down for economic reasons. They are also
8 facilities in major load centres which can impact
9 population concentrations. And so, I believe that
10 would also be consistent with an environmental for
11 social reasons as well, and the two reasons in that
12 case would be in alignment.

13 Q. So, you're saying social and
14 environment reasons?

15 A. The primary reason was a cost
16 reason--

17 Q. Oh.

18 A. --but that social and environmental
19 reasons - and Hearn was burning coal at the time it was
20 shut down - would have been in the same direction as
21 the cost decision.

22 Q. Yes? And can you comment on Lakeview
23 in any way?

24 A. Can you repeat your question in
25 respect to Lakeview, please.

1 Q. Yes. Limited operation of Lakeview.

2 A. Sorry?

3 Q. Limited operation of Lakeview.

4 A. The same comment would apply to
5 limited operation.

6 Q. Okay. All right.

7 Have there been any suggestions or
8 considerations that those facilities be completely done
9 away with and some other use of the site made --
10 non-generation use?

11 A. Clearly the objections to the restart
12 of Hearn, which we did have, imply a suggestion that
13 the plant is not acceptable.

14 Q. Yes?

15 A. I don't know of formal proposals for
16 the elimination of either of those two plants.

17 Q. Can you tell me what Hydro's position
18 would be with respect to doing away with the generating
19 facilities at either of those sites?

20 A. Those sites have considerable value
21 as generating station sites.

22 Q. Okay.

23 A. That would have to be taken into
24 account in any consideration of such a proposal.

25 Q. Okay. But you can't give me a

1 yes-or-no answer on that?

2 A. It's a hypothetical situation at the
3 moment, and I don't know for what reason a proposal
4 would be made to eliminate them.

5 Q. You've mentioned that there are
6 social and environmental oppositions.

7 A. It would have to be a balance.

8 Q. Okay. Now, I have some map-related
9 questions. Would you turn to Exhibit 79, please, the
10 southern part of Ontario Hydro's system map.

11 This could be interesting. I see from
12 what the Board is using I think you have a 1988
13 version; is that correct?

14 THE CHAIRMAN: 79 is the Exhibit you
15 referred to.

16 MRS. MACKESY: Yes.

17 MS. PATTERSON: 1988.

18 MRS. MACKESY: Yes. Okay. There's been
19 a revision to Exhibit 79, and I believe that's what the
20 panel is bringing forward now. But having both
21 versions is probably helpful to the questions I'm going
22 to ask at this point.

23 MR. BARRIE: We have the June '88 version
24 here.

25 MRS. MACKESY: Okay. I believe this

1 version, the one that's on display, is a 1991 version.

2 Thank you.

3 Q. Now, first of all, are the operating
4 areas or what were called "operating areas" earlier in
5 the 1980's, are they now called "districts"? Is that
6 the same --

7 MR. BARRIE: A. I don't know what the
8 earlier references are, but perhaps I could explain
9 what areas are.

10 Q. Perhaps if you turn to page 19 in my
11 interrogator package. In that question I referred to a
12 1983 Ontario Hydro environmental assessment, which
13 showed use of electricity by Ontario Hydro's operating
14 areas. And that's the basis for my question.

15 I'm under the impression that there's
16 just been a change in name and no change in the
17 geographic boundaries, except in cases where two might
18 have been amalgamated into one.

19 A. I think you have to look at the way
20 Ontario Hydro is currently organized. There have been
21 changes made. I don't know exactly when they were, but
22 one must distinguish between two functions being
23 carried out, the wholesale function and the retail
24 function.

25 Q. Okay.

1 A. And there are areas and districts
2 referred to in both functions which can cause confusion
3 unless we're very clear about what it is we're talking
4 about.

5 Q. Okay.

6 A. Your reference in your Interrogatory
7 1.29.1 that had all the customer loads--

8 Q. Yes?

9 A. --and I think references areas as
10 laid out on here. These are --

11 Q. Which is called "district" on the
12 map?

13 A. Okay. They're retail areas.

14 Q. Okay.

15 A. So, this has nothing to do with the
16 bulk generation and transmission. It's to do with the
17 retail function of selling to customers.

18 Q. But are the boundaries the same for
19 the districts?

20 A. Which districts?

21 Q. Well, the boundaries are listed -- I
22 believe, on that revised 79 it refers to those units as
23 districts. Would they have the same geographic extent
24 as the operating areas?

25 A. Wholesale districts have different

1 boundaries to retail areas.

2 Q. Okay.

3 A. There are two distinct functions
4 being --

5 Q. You carry on with your explanation.

6 Maybe I'll have some questions.

7 A. This map here and the response to
8 your interrogatory list - response 1.29.1, the second
9 page of this - refers to Hydro's rural operating areas.

10 Q. Well, in previous testimony, in Panel
11 1, I was under the impression that that included the
12 total use within the boundary of the operating area,
13 which would include the municipal utilities and the
14 direct industrial.

15 A. It does.

16 Q. Yes. Okay.

17 A. You can add these all up, and I think
18 you'll get the total Ontario load.

19 Q. Yes. Right.

20 A. So, if we keep talking about
21 operating areas, then we're talking about the same
22 thing.

23 Q. Okay.

24 A. Now, did you want to refer to the
25 boundaries that are on this map here?

1 Q. Yes.

2 A. Okay. These boundaries, to the best
3 of my knowledge, are correct. However, there is one
4 point of confusion in the Toronto area.

5 Q. Yes. Okay. All right.

6 THE CHAIRMAN: Perhaps if you can explain
7 what the point of confusion is in the Toronto area.

8 MR. BARRIE: Unfortunately you don't have
9 the same map.

10 THE CHAIRMAN: It's all right. Just
11 carry on.

12 DR. CONNELL: I wonder if that should be
13 given a different exhibit number so the transcript will
14 know which we're referring to.

15 THE CHAIRMAN: Yes. Perhaps we can give
16 those two maps new exhibit numbers.

17 THE CLERK: 172, Mr. Chairman.

18 ---EXHIBIT NO. 172: 1991 version of southern part of
19 Ontario Hydro's system map.

20 MR. BARRIE: It's the same as the map
21 provided in response to Interrogatory 1.29.1. This
22 map's the same as this one. There is a reference to
23 Lakefront.

24 MRS. MACKESY: Could I just make -- since
25 this is being made a new exhibit, there is both a north

1 and a south portion to this new map. How is that going
2 to be shown in the exhibit numbers?

3 THE CHAIRMAN: We're just on the south
4 portion at the moment; is that right?

5 MRS. MACKESY: Right.

6 THE CHAIRMAN: You're only talking about
7 the south portion.

8 MRS. MACKESY: Okay.

9 MR. BARRIE: Yes.

10 THE CHAIRMAN: Go ahead.

11 MR. BARRIE: In the Metropolitan Toronto
12 area, there are no rural customers. Everything is done
13 by municipalities, such as Toronto Hydro, Oakville
14 Hydro, et cetera. So, the area labelled lakefront
15 there, there is no operating area, as such.

16 MRS. MACKESY: Q. Okay.

17 A. There is no retail function being
18 carried out. The way the line is drawn would imply
19 that this is called "Central Region Wholesale." That's
20 what's on the map.

21 Q. Yes?

22 A. That is incorrect.

23 Q. Oh.

24 A. Central region wholesale comprises
25 the whole area right up to Georgian Bay. This is where

1 the confusion comes in between retail and wholesale.

2 Q. So, you're saying that central region
3 wholesale includes what is marked on this map both as
4 the Georgian Bay region and central region?

5 A. Yes.

6 Q. All right.

7 A. There are only five regions. The
8 response to your interrogatory was, in fact, not
9 correct. They reference six regions.

10 Q. Was the situation in 1988 when the
11 DSP was being prepared a situation where there were six
12 regions? Because I think --

13 A. I think that may be correct, yes.

14 Q. Okay.

15 A. But right now there are five
16 wholesale regions.

17 Q. All right.

18 A. There are five retail regions.

19 Q. All right. The name Georgian Bay and
20 Central, now currently is just Central; is that
21 correct?

22 A. Central region wholesale covers the
23 area that's marked off as Central Regional plus
24 Georgian Bay region. And that's a wholesale area.
25 That is, they have no function in the retail business.

1 Their business is wholesale.

2 Q. But there still is a Georgian Bay
3 retail area.

4 A. The same geographical area is also
5 called Georgian Bay Retail Region.

6 Q. One last point on that. In the
7 tables I have included in this interrogatory package,
8 page 20, there is a listing for Markham and Metro.

9 A. Yes.

10 Q. They represent what is labelled
11 "Lakefront" on this map, Exhibit 172. Do they
12 represent the use within the central region?

13 A. To the best of my knowledge, yes.
14 But I didn't prepare this interrogatory. But I've
15 checked the numbers and it seems to be consistent with
16 your statement there.

17 Q. Okay.

18 A. There is nowhere else in the list to
19 pick up loads, such as Oakville or Brampton, which
20 would not -- I would not refer to as Metro, but there
21 is nowhere else on the list for them. So, I think
22 they're included in that Metro total.

23 Q. Could I have a firm clarification on
24 that?

25 MRS. FORMUSA: We've been dealing with

1 this through some correspondence with Mrs. Mackesy. I
2 thought we --

3 MRS. MACKESY: I haven't had any reply.

4 MRS. FORMUSA: I thought Mr. Skuce had
5 provided you with some correspondence on this.

6 MRS. MACKESY: I haven't received any.

7 MRS. FORMUSA: We will be happy to
8 clarify if this is still not clear.

9 MRS. MACKESY: Can I depend on what is
10 being said as the situation?

11 MRS. FORMUSA: Well it may be best if we
12 sit down and once again try and go through this. But
13 are you suggesting then that the letter of April 26th
14 does not clarify it to the extent that --

15 MRS. MACKESY: I don't think so. I was
16 talking about something else.

17 THE CHAIRMAN: Well, I think Mr. Barrie
18 gave an answer, which he thought the figures were
19 consistent with showing the Metro and Markham areas
20 within a certain description.

21 MRS. FORMUSA: Yes.

22 THE CHAIRMAN: And all that, I think,
23 Mrs. Mackesy wants to know is: Is that so or is this
24 not so? And I think that can be checked.

25 MRS. MACKESY: Yes. That's correct, yes.

1 MRS. FORMUSA: And we could undertake to
2 check to.

3 MR. BARRIE: Yes. We'll check with the
4 people who put this answer together to make sure that
5 my reading of it is correct.

6 THE CHAIRMAN: So this should be
7 142-something.

8 MRS. FORMUSA: 79.

9 THE CHAIRMAN: 79?

10 MRS. FORMUSA: 142.79.

11 ---UNDERTAKING NO. 142.79: Ontario Hydro to provide
12 whether what is labelled "Lakefront" on
13 the map, Exhibit 172, represents the use
14 within the central region.

15 THE CHAIRMAN: And perhaps if there's
16 other map that supplements the first one, it would be
17 convenient to put it in as the next exhibit so we'll
18 have it. Is there another map of the northern area?
19 Should we not put that in now?

20 MRS. FORMUSA: They could be given the
21 same exhibit number. It's just the rest of Ontario.

22 THE CHAIRMAN: All right, except that if
23 people are talking about it in the transcript, they'll
24 have one or the other that they're looking at. That's
25 all.

 MRS. FORMUSA: We can give it a

1 separate --

2 THE CHAIRMAN: So make them two separate
3 exhibits. So it will be the next exhibit, whatever
4 number that is.

5 THE CLERK: 173.

6 THE CHAIRMAN: 173. That will be the
7 northern part of the map?

8 MRS. FORMUSA: What we might do is, on
9 the exhibit list, which just lists 79 as the original
10 map, what we had done was we filed the revised map with
11 all the parties and gave copies to Board staff, but
12 perhaps we can make a note in the exhibit list to show
13 that it's been revised and now is Exhibit 172.

14 ---EXHIBIT NO. 173: 1991 version of northern part of
15 Ontario Hydro's system map.

16 THE CHAIRMAN: Right. Are we through
17 with the maps?

18 MRS. MACKESY: We're through with that
19 map, yes.

20 THE CHAIRMAN: All right.

21 MRS. MACKESY: Excuse me just a moment.
22 Perhaps you'd like to leave it out for the next series
23 of questions. I don't think it's --

24 THE CHAIRMAN: It's a little bit
25 inhibiting in making notes. That's all.

1 MRS. MACKESY: Q. I'm going on now to
2 Interrogatory 2.29.3, which is on page 23 of my
3 interrogatory package.

4 In this interrogatory, I asked for a list
5 based on The figure 4-20 on Exhibit 3 showing the
6 operating, and I asked that Hydro provide a list
7 showing the operating area in which each of the
8 generating stations listed in figure 4-20 is located.

9 Now, they didn't provide me with such a
10 list, but the Panel 2 coordinator, Mr. Skuce, told me
11 in a letter dated April 26th, 1991, how I would be able
12 to compile such a list myself, and I'd like to read
13 that short information and have it confirmed that
14 that's how I would do it.

15 With regard to 2.29.3, Mr. Skuce said:

16 "Hydro's generating stations provide
17 electricity to an integrated power system
18 and do not, therefore, supply electricity
19 to specific operating areas. Hydro has
20 divided the province into operating areas
21 in order to deal directly with customer
22 concerns, such as paying bills, handling
23 complaints, installing new hookups, et
24 cetera.

25 "On the attached map, which is an

1 [11:53 a.m.] update to Exhibit 79, operating areas are
2 shown in black."

3 I assume that's the map that's now been
4 made Exhibit 172.

5 "The geographic area of each
6 generating station is also shown. It is
7 possible, therefore, to determine the
8 location of each generating station
9 within an operating area. For example,
10 Bruce NGS in the Walkerton area, JC Keith
11 TGS in the Essex area and Darlington NGS
12 is in the Lakeshore area. A list of the
13 operating area of each generating station
14 is not available."

15 Could I just confirm that if I wanted to
16 to compile such a list myself, all I would do is put
17 down the name of the district from that map and the
18 names of the operating areas, names of the generating
19 stations as I find them within the district boundaries?

20 MR. BARRIE: A. You could do that and
21 you would be mixing up a wholesale function and a
22 retail boundary, but could you do it, yes.

23 Q. But if I wanted locate --

24 A. If you just want the geographic
25 location, it would be good for that, yes.

1 Q. Yes. Not taking into account whether
2 its retail or wholesale?

3 A. The boundaries we have given you on
4 this map are retail boundaries.

5 Q. Yes, I suppose we do need Exhibit 79
6 or 172, whichever your working from. The two circuit
7 500 kV line from BNPD to Longwood would be shown on
8 Exhibit 172, I gather, but not on Exhibit 79; is that
9 correct?

10 A. It's not on 79.

11 Q. But it does appear on 172. It may be
12 difficult to see because it's a very fine line.

13 A. Yes, it is.

14 Q. Thank you. The single circuit 500 kV
15 line from Longwood to Nanticoke generating station,
16 that's not shown, or is it shown on 172?

17 A. Yes, it is on.

18 Q. Is that partly a dual voltage line?

19 A. Pardon?

20 Q. Is that partly a dual voltage line?

21 A. No, it's a 500 kV.

22 Q. On that map, okay.

23 A. Can you just tell me what do you mean
24 by dual voltage line?

25 Q. Where you would have a 500 circuit on

1 one side and a smaller circuit on the other.

2 A. I think parts of the route are like
3 that, but there are parts where it is not like that.

4 Q. Not like that, fine, just 500.

5 What is the latest estimate on when that
6 London-to-Nanitcoke line would come in service? I
7 believe in the interrogatories it was saying August.

8 A. I think it is still August.

9 Q. Still August. I am finished with
10 these large maps.

11 I would like to turn to Exhibit 136,
12 which was the list of overheads used by Ontario Hydro
13 in presenting their evidence in chief in Panel 2. I
14 want to turn to page 25 of 136, and this is a
15 transmission schematic.

16 Are you ready for some questions now?

17 A. Carry on.

18 Q. Sorry. Now, looking at that map,
19 there is a double line from Bruce NPD down to Milton.

20 A. Yes.

21 Q. That shows two circuits, I gather
22 they are really on one tower line; is that correct?

23 A. Yes.

24 Q. There are also some finer lines
25 showing lines up to Owen Sound, north and running down

1 from Bruce NPD to Stratford in the south, and then in
2 the middle, running from Bruce NPD to Orangeville and
3 back up to Essa. Are those two circuit, 230 kV lines?

4 A. Yes, they are.

5 I am not sure where the line of
6 questioning is going. This was a simplified version of
7 the transmission system which I was trying to get a
8 point across about transmission limits. So, I don't
9 want to be read as too specifically correct.

10 Q. Good, that was the point I wanted to
11 make. Because it shows two lines for the double
12 circuit 500, but it doesn't show two lines for the
13 double circuit 230s.

14 A. That's correct. I was trying to get
15 across the double circuit 500 is the specific worse
16 loss that we are normally trying to cater for, and that
17 is why it was shown that way, really.

18 Q. And in my interrogatory on page 24 of
19 the interrogatory package, No. 2.29.11, it mentions
20 another line out of Essa which is running west towards
21 Collingwood. That wouldn't be shown on that map
22 either, is the last paragraph, the existing 115 kV
23 single circuit wood pole between Essa TS and a point of
24 south of Collingwood would be replaced with a one
25 double circuit 230 kV line.

1 A. Yes, this a future development which
2 wouldn't be shown on this map.

3 Q. According to this interrogatory
4 response, that is contemplated as being available in
5 1994?

6 A. I don't have any further information
7 on that.

8 Q. Thank you. Are all the maps in the
9 Demand/Supply Plan hearing and in Exhibit 79 and in
10 Exhibit 172, are they all diagrammatic to a greater or
11 lesser degree, in that, you couldn't tell from them
12 exactly where the lines are on the ground or how close
13 they are together, if you had two lines close together
14 in one corridor? For instance, the Bruce-to-Milton
15 line and the Bruce-to-Orangeville line?

16 A. You certainly couldn't tell from this
17 overhead. I think on the geographic map, 172, I think
18 it does give some indication on geographical proximity,
19 but you couldn't tell whether it was 100 yards apart or
20 whether it was 200 yards apart.

21 Q. No. Or whether they were immediately
22 adjacent to each other?

23 A. Right.

24 Q. Lastly, I have some questions about
25 the Bruce Nuclear Power Development and they refer to

1 last two pages of my interrogatory package, 25 and 26.

2 I will begin with Interrogatory 2.29.1, on page 25.

3 I believe, Mr. Barrie, that you said in
4 Volume 20 on pages 3482 to 3483 that the current load
5 at the Bruce heavy water plant was about 50 megawatts?

6 MR. TABOREK: A. I think I may have said
7 that rather than Mr. Barrie.

8 MR. BARRIE: A. Excuse me, before you go
9 on. As I recall that particular quote, that was to do
10 with just the heavy water plant?

11 Q. Yes.

12 A. Not the site.

13 Q. Not the site, no.

14 A. Fine, yes.

15 Q. Now, in this Interrogatory 2.29.1, it
16 gives some figures for, I believe, three Bruce heavy
17 water plants, the third item down, Bruce heavy water
18 plant B?

19 A. Yes.

20 Q. And further down, Bruce heavy water
21 plant D, and Bruce heavy water plant A, now the load
22 listed there is in excess of 75. Can you explain what
23 the difference would be between this figure and the one
24 given in --

25 A. This this is peak. This is peak of

1 the year, I believe. All the peak power demands and I
2 think the 50 quoted was an estimate of a typical
3 number. I think this should be the number you use if
4 you are addressing the peak.

5 Q. Okay. And could you just explain to
6 me what the difference between MWe and MWee is in this
7 interrogatory?

8 A. Well, this chart shows two kinds of
9 power, two kinds of energy, one electrical, and the
10 other steam.

11 So, we are delivering steam from Bruce
12 "A" to the heavy water plant and elsewhere, as shown on
13 the chart.

14 In order to give some context to the
15 numbers, we convert the steam energy to a megawatt
16 electrical equivalent, so that is the ee. It allows
17 you to make a comparison between the two kinds of
18 energy.

19 Q. Frequently the term "megawatt" has
20 been used in the evidence up to this point. Is that
21 the equivalent of megawatt with a small e?

22 A. Yes. It's megawatt electric.

23 Q. Megawatt electric. Thank you.

24 What is the relationship of these
25 figures, megawatt electrical to the megawatt peak

1 capacity figure for Bruce "A" and "B" stations as given
2 in Exhibit 3 on pages 4-20?

3 DR. CONNELL: Page 4-?

4 MRS. MACKESY: 20.

5 MR. BARRIE: The listing shown in the DSP
6 report provides the net electrical output.

7 MRS. MACKESY: Q. Yes?

8 MR. BARRIE: A. The net electrical
9 output is the gross output of the generators,
10 subtracting the electrical load that has to be supplied
11 at the station.

12 Q. Is that what is shown in 2.29 --

13 A. These are the electrical loads that
14 have to be supplied at the station. So, if you wanted
15 to make a comparison, if you wanted to know the gross
16 output you could take what is in the DSP report, and
17 add on these and you will get the gross output from the
18 generating units.

19 Q. And finally, turning to the last page
20 of the interrogatory package, page 26.

21 This is Interrogatory 2.29.7 and it shows
22 a total net generation figure of 35,709 gigawatts from
23 Bruce "A" and "B" generating stations in 1990. That's
24 what is being sent outside the complex. That wouldn't
25 include the internal?

1 A. Yes. It says net, net generation.

2 And you must say gigawatthours.

3 Q. Gigawatthours, I'm sorry. Yes.

4 A. Yes, this is correct. This is what
5 was going out onto the grid system, having subtracted
6 off the station loads already.

7 Q. The total primary demand for the
8 province in 1990 was 136,744 gigawatthours?

9 A. Yes.

10 Q. According to this reply. Now, if I
11 wanted to calculate the amount of primary demand filled
12 by the Bruce generating stations, would I just divide
13 that 136,744 into 35,709?

14 A. Yes. We provided the two numbers so
15 that you could get some idea of the contribution of
16 Bruce to the total.

17 Q. When I did that I got about 26 per
18 cent. Does that sound about right?

19 A. Yes.

20 Q. Okay.

21 Now, I asked in that interrogatory what
22 parts of Ontario does generation from the Bruce nuclear
23 power development currently serve, and the reply was
24 that it is fed into the integrated transmission system
25 and as a result it's not possible to identify actual

1 loads that are supplied by the Bruce nuclear power
2 development. However, I just want to ask a few more
3 general questions based on that.

4 Does power from the Bruce Nuclear Power
5 Development go into northern Ontario through that 230
6 connection--

7 A. Sometimes.

8 Q. --from Bruce around to Orangeville
9 and Essa? Okay.

10 A. Sorry. Yes, power is always going
11 that way.

12 Q. Is always going that way.

13 A. Which particular circuit?

14 Q. The 230.

15 A. I think it is fair to say that all of
16 those circuits leaving Bruce, almost without exception,
17 will always be exporting out of Bruce. There is very
18 little load at Bruce.

19 Q. Yes.

20 A. So, yes.

21 Q. So, when we spoke about the map on
22 page 25 of Exhibit 136 and mentioned those 230 kV
23 lines --

24 A. Yes.

25 MRS. MACKESY: I think that's all my

1 questions. Thank you have very much.

2 THE CHAIRMAN: Thank you, Mrs. Mackesy.

3 Mr. Hunter, you are next. Mr. Trivett,
4 you are next. But perhaps we have should take the
5 break first. We will take 15 minutes.

6 THE REGISTRAR: This hearing will recess
7 for fifteen minutes.

8 ---Recess at 11:40 a.m.

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1 ---On resuming at 11:40 a.m.

2 THE REGISTRAR: Please come to order.

3 This hearing is again in process. Please proceed.

4 THE CHAIRMAN: Mr. Trivett.

5 MRS. MACKESY: Thank you, Mr. Chairman,
6 members.

7 CROSS-EXAMINATION BY MR. TRIVETT:

8 Q. Mr. Barrie, at page 2714 of Volume
9 16--

10 THE CHAIRMAN: 16.

11 MR. TRIVETT: Q. --we made the reference
12 to Darlington, that Darlington is considered part of
13 the existing system. That's just to quote this.

14 I wondered if you could describe for us
15 the transformers and their configuration at the
16 Darlington plant?

17 MR. BARRIE: A. I couldn't, no.

18 Q. Is this a matter which you feel has
19 to be raised with the nuclear panel or is it something
20 on which we should have an undertaking?

21 A. We could provide an undertaking to
22 provide you with --

23 What do you want?

24 Q. Well, we wanted to know how they are
25 connected up and how they have, in fact, dealt with the

1 load that which they have been endeavoring to handle.
2 In other words, what we are looking for is whether or
3 not --

4 THE CHAIRMAN: But there's no production
5 on Darlington yet.

6 MR. BARRIE: There has been.

7 MR. TRIVETT: There has been, Mr.
8 Chairman.

9 MR. BARRIE: There is none at this
10 instant in time.

11 THE CHAIRMAN: Oh. There has been. I
12 wasn't aware of that.

13 MR. TRIVETT: Q. It's really a question
14 of, for example, can the circuits from the generators
15 to the the transformers be switched to all or
16 different -- how are they used in combination?

17 MR. BARRIE: A. I think we should take
18 an undertaking to provide you with the technical data
19 on the transmission equipment out of Darlington.

20 Q. And the record of their actual
21 performance when they were put into production? In
22 other words, the percentage that they were, in fact,
23 able to handle?

24 A. I'm not sure what would be available
25 on that. We could probably give you the typical

1 loading on each transformer and the outgoing circuits.

2 Q. Do you know that there is a problem
3 in those transformers?

4 A. No. I'm not aware of any problem
5 with the transformers.

6 Q. They're still in a sort of run-in
7 period?

8 A. To the best of my knowledge, they
9 have operated satisfactorily since they were put in
10 service.

11 MR. TRIVETT: Do we need an undertaking
12 on that, Mr. Chairman?

13 THE CHAIRMAN: Well, if you want the
14 information and Mr. Barrie's offered it, it should
15 probably be listed.

16 MS. PATTERSON: 142.80.

17 THE CHAIRMAN: If you want that.

18 MR. TRIVETT: I do, yes.

19 THE CHAIRMAN: His evidence is that
20 they've operated satisfactorily since putting it in
21 service.

22 MR. TRIVETT: That is correct. But we
23 still want to know how they operate.

24 THE CHAIRMAN: All right. And the extent
25 to which they operate.

1 MR. TRIVETT: And the extent to which
2 they have been operating.

3 THE CHAIRMAN: I think you have to be
4 careful as to what you want, what you're offering and
5 what they expect.

6 MR. BARRIE: By operating satisfactorily,
7 I mean that they have never been overloaded or they
8 have never caused a trip of the generator or anything
9 like that. I'm not sure what local data we will have
10 on the actual loading of the transformers. We would
11 normally have some data on whether they were loaded at
12 20 per cent or 50 per cent or whatever of the rating.
13 I'm not sure what data we have. I could provide
14 whatever we have.

15 MR. TRIVETT: Q. Would it be a practice
16 in this sort of thing to test to full loading?

17 MR. BARRIE: A. Before it goes into
18 service, that would be normal test procedure on a
19 transformer?

20 Q. I would have thought so.

21 A. But that's really invisible to us.
22 When it's handed over to us, it's been in service.
23 That's already been carried out.

24 Q. So, you would know what maximums it
25 has been operated at in service after it was handed

1 over?

2 A. Yes.

3 Q. And that's really what I'm asking.

4 A. I think we can provide that.

5 Q. All right.

6 THE CHAIRMAN: 142 point --

7 MS. PATTERSON: 80.

8 THE CHAIRMAN: 80.

9 ---UNDERTAKING NO. 142.80: Ontario Hydro to provide
10 the technical data on the transmission
11 equipment out of Darlington and the
12 record of their actual performance when
13 they were put into production; the
typical loading on each transformer and
the outgoing circuits, as well as the
maximums it has been operated at in
service after it was handed over.

14 MR. TRIVETT: Q. Now, when Mr. Hunter
15 was looking over the turbine haul at Darlington, he
16 noticed that both Units 1 and 2 are under repairs and
17 that No. 2 had a new shaft sitting beside it.

18 My question is: Is the generator shaft
19 in Unit 1 cracked or broken? Do you know what the
20 problem is there?

21 MR. BARRIE: A. I think I've on two
22 occasions described my knowledge of the Darlington
23 situation. I don't know specifically any other problem
24 on the No. 1 rotor. We have a panel coming up with
25 nuclear experts I'm sure they will be able to give you

1 all the information you want.

2 Q. Fine. I have some trouble in
3 understanding a thing which is called "VARs," and I was
4 wondering whether you are a person to explain that or
5 is that something also that should be explained by the
6 nuclear panel. I take it I'm not alone in having
7 difficulty understanding VARs.

8 MRS. FORMUSA: No, you're not.

9 MR. BARRIE: MegaVARs should not be
10 addressed to the nuclear panel. MegaVARs are a general
11 electrical issue.

12 MR. TRIVETT: Q. That's what Mr. Hunter
13 advised me.

14 MR. SNELSON: A. I can give you a fairly
15 simple description. It is a very complex subject.
16 Several times in his evidence, Mr. Barrie has referred
17 to units being operated to maintain the voltage on the
18 system, and that is a careful set of words that avoids
19 using the word "VARs" to avoid this discussion.

20 There are two sorts of power flows that
21 occur on the transmission system. There is the flow of
22 power which actually causes the transfer, permanent
23 transfer of energy from one place to another, and there
24 is the movement of energy between different sorts of
25 energy storages in the system.

1 Some energy storages are associated with
2 the electric fields and occur at one point in the
3 cycle, and other sorts of energy storages are
4 associated with magnetic fields and occur at another
5 point in the cycle.

6 So, there are different sorts of energy
7 storage, and there is an energy flow between the two
8 different kinds of energy storage that goes backwards
9 and forwards.

10 This causes voltage drops on the system,
11 which is undesirable, and it can be generally avoided
12 by arranging that the two different sorts of storages
13 occur close to each other physically so that the
14 oscillating movements of energy don't have to go any
15 great distance because it's the movement of this
16 oscillating power component over a long distance that
17 causes the voltage drops that are undesirable.

18 And this other type of power flow is
19 called "reactive power flow." It is sometimes given
20 the name "VARs", it's cap V-A-R-s, which stands for
21 "volt amperes reactive."

22 Q. Thank you for the explanation, but
23 I'm not sure I can retain that. I'll certainly be able
24 to consult the record.

25 Can you then say whether this type of

1 problem relates to the shaft problem or is this totally
2 unrelated?

3 A. We believe that as regards the
4 torques on the shaft which the shaft has to withstand,
5 that the reactive power production of the generating
6 unit is not a factor in that.

7 Q. Is the problem of these generator
8 shafts considered to be a design problem?

9 MR. BARRIE: A. Well, it is being
10 handled by the manufacturers, ASEA Brown & Boveri. So
11 yes, it is a design problem in that context.

12 Q. Is it common to 3 and 4, and have the
13 shafts for 3 and 4 been delivered?

14 A. I don't know.

15 Q. Could you undertake to find that out
16 for me?

17 A. I don't think so.

18 Q. No?

19 A. I don't think anyone in Ontario Hydro
20 will know. Whether they've been delivered, I think we
21 can answer that. But whether the problem that we have
22 experienced with 1 and 2 is going to occur on 3 and 4,
23 I don't know, and I have no way of finding out.

24 MR. SNELSON: A. We would expect that
25 any modifications that are made to Units 1 and 2 to

1 prevent the recurrence of the problem would also be
2 made to Units 3 and 4 or equivalent solutions.

3 Q. And are those modifications the
4 manufacturer's modifications? Is that what I
5 understood Mr. Barrie to say?

6 MR. BARRIE: A. That's what's currently
7 going on now.

8 Q. Well, is that redesign then occurring
9 with the manufacturer or is that design occurring in
10 Ontario Hydro's own design facility and department?

11 MR. SNELSON: A. I don't think any of us
12 here are familiar with the details of the interaction
13 between Ontario Hydro's design people and the
14 manufacture's people on solving this problem.

15 Q. So this would be proper to put over
16 to the nuclear panel?

17 A. Yes.

18 Q. Mr. Hunter wondered whether there
19 would be design people here at that time?

20 A. There will be people from our design
21 and development division represented on the nuclear
22 panel.

23 Q. Thank you very much. If you haven't
24 already supplied it elsewhere, Mr. Barrie, do you have
25 the original costs of Darlington in '91 dollars

1 available?

2 MR. BARRIE: A. No.

3 Q. Nor any of the revisions that have
4 been done? Would it be possible to supply that
5 information?

6 MR. SNELSON: A. I believe that a
7 history of Darlington costs has been provided through
8 interrogatory in Panel 9 interrogatories. Possibly not
9 to yourself but to other intervenors.

10 Q. No. If you have any way of finding
11 that, perhaps you'd let me know just exactly where it
12 is, if you know. Otherwise, we'll have to search for
13 it.

14 Does counsel have any recollection of who
15 that was supplied to?

16 MRS. FORMUSA: Panel 9 has over a
17 thousand interrogatories now.

18 THE CHAIRMAN: Are you saying that's been
19 answered already? Is that what you're saying?

20 MR. SNELSON: My recollection is I've
21 seen a draft of an answer. I know the question has
22 been asked. I can't say definitively if the answer has
23 gone out.

24 MRS. FORMUSA: We can do a computer
25 search to locate the question, and that will deal with

1 costs and let Mr. Trivett know.

2 MR. TRIVETT: Thank you.

3 Q. My next question was to inquire
4 whether there were comparable overruns or overruns at
5 large coal plants.

6 THE CHAIRMAN: Excuse me, Mr. Trivett.

7 Excuse me. Should we put a number on that one so taht
8 we don't lose track of it?

9 MR. TRIVETT: It may be easier.

10 THE CHAIRMAN: 142.81.

11 ---UNDERTAKING 142.81: Ontario Hydro undertakes to
12 provide the original costs of Darlington
in '91 dollars.

13 MR. TRIVETT: Thank you.

14 Q. Were there cost overruns at large
15 coal plants such as the rehabilitation project at
16 Lakeview and Lambton? Would that be information within
17 your knowledge?

18 MR. BARRIE: A. The estimate of the cost
19 of doing the work at Lakeview and Lambton did increase,
20 and I think we provided some data on that already.

21 MR. SNELSON: A. There are a number of
22 interrogatories dealing with Lakeview and Lambton
23 rehabilitation costs. My notes indicate they're
24 Interrogatories 2.9.11, 2.9.27, and 2.24.15.

25 Q. Thank you, very much. That's very

1 helpful.

2 Do you have knowledge of any of the
3 capital projects which were cancelled because of the
4 nature of cost overrun?

5 A. Are there any specific projects you
6 have in mind?

7 Q. Yes. The upgrading at Lambton or
8 Lakeview.

9 MR. TABOREK: A. In my direct testimony
10 I mentioned that the original rehabilitation of
11 Lakeview was to rehabilitate all eight units, and,
12 simply speaking, we are now only rehabilitating four
13 and reviewing the options with respect to the remaining
14 four.

15 Q. Was this because of the costs of the
16 upgrading?

17 A. Yes.

18 Q. Who plans this rehabilitation? Is
19 that planned by design and construction? That's an
20 internal Hydro matter. Or is that something let out to
21 outside contracts?

22 A. The planning, in the case of
23 Lakeview, was essentially done by divisions inside
24 Hydro. Essentially, the design and development
25 division would look at the problem areas and recommend

1 alternative solutions, and the system planning division
2 would evaluate the various packages in light of the
3 system needs, and compare them with alternatives to
4 rehabilitation.

5 In that process, outside consultants are
6 frequently involved in providing detail because there
7 is a lot of different packages of work done.

8 Q. Thank you. My next question has to
9 do with the design inadequacies in other areas such as
10 as the DESN stations and the microwave towers.

11 Are those still being designed by your
12 internal design and construction department?

13 MR. SNELSON: A. I presume you're
14 talking about the transformer stations that transform
15 from the bulk system to the regional system?

16 Q. That's correct.

17 A. And that's what we sometime refer to
18 as DESN stations. I wasn't sure what the reference to
19 the microwave towers was relating to.

20 Q. In terms of particular towers or in
21 terms of the designing of them? It's my understanding
22 that both are designed internally -- or were.

23 A. I don't think anybody in this panel
24 has that degree of detail of the design of these
25 particular parts of the -- what is the regional

1 delivery system.

2 Q. Where might that inquiry be properly
3 directed to?

4 A. It's more closely related to design
5 and development of the transmission system, but it is
6 not a bulk transmission issue either and --

7 Q. But the people in that might have
8 that knowledge?

9 A. They may do, but I couldn't guarantee
10 it.

11 MRS. FORMUSA: Mr. Chairman. If I might
12 at this point, I'm wondering at the relevancy of the
13 question with respect to the design of those
14 facilities. I'm not quite sure what Mr. Trivett is
15 after. And perhaps if we knew that, we might be able
16 to say whether we can be helpful or not.

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1 [12:00 p.m.] THE CHAIRMAN: Mr. Trivett?

2 MR. TRIVETT: Yes. Well, Mr. Chairman,
3 it's my understanding that what was formerly internal
4 design is now being designed on a turnkey basis outside
5 which must leave some relationship to what is done
6 internally and what is done outside, and it was that
7 relationship that I wanted to inquire into, as being
8 part of the existing system and the manner in which the
9 existing system is designed and operated.

10 We have some questions later, as you will
11 understand, with the whole question of the designing of
12 the system, and these relate to the record of the
13 people who have been doing the system design.

14 THE CHAIRMAN: You are talking about the
15 design of transmission facilities, is that what you are
16 talking about?

17 MR. TRIVETT: I believe your design and
18 construction department deals with a great many parts
19 of the operation, not just transmission or just any
20 one.

21 THE CHAIRMAN: What is it you are
22 addressing your questions to at this point?

23 MR. TRIVETT: The record of the design
24 history of internal design of Hydro.

25 THE CHAIRMAN: Of what?

1 MR. TRIVETT: Various facilities.

2 THE CHAIRMAN: That's pretty broad.

3 MR. TRIVETT: Well, it is. They deal
4 with, pretty well, all sections; do they not?

5 They deal with the nuclear design, they
6 deal with the hydraulic design, they deal with the
7 transmission and with the...

8 THE CHAIRMAN: But are these designs of
9 new facilities, or what is the relationship to existing
10 facilities? That is what I am having trouble with.

11 MR. TRIVETT: Because the existing
12 facilities were designed by them and they have certain
13 problems in those systems.

14 THE CHAIRMAN: We are taking the existing
15 system as it now is. What are you directing your
16 question to?

17 MR. TRIVETT: We wanted to look at the
18 record of existing system as it was designed, what it
19 was designed to perform and what it has, in fact,
20 performed, and we don't seem to have somebody here who
21 can talk to that.

22 THE CHAIRMAN: Where does that fit into
23 what we have to do here? We have to look at the
24 existing system and assess what the existing system is.

25 MR. TRIVETT: Right.

1 THE CHAIRMAN: What it was designed to do
2 doesn't really matter.

3 What does the existing system do and then
4 how does that relate to the demand and supply
5 situation.

6 MR. TRIVETT: Well then, when you come to
7 look at the proposed design, you have to relate to its
8 intended objective and historical achievements.

9 THE CHAIRMAN: I can understand that, but
10 I am not sure how it's helpful. Let's assume that some
11 of the part of the existing system was designed one way
12 and it has overacheived or underachieved, what
13 difference does that make to us, the panel?

14 MS. PATTERSON: Are you saying that there
15 has to be taken into account, in the planning, a
16 certain error factor or design problem factor--

17 MR. TRIVETT: That is correct.

18 MS. PATTERSON: --that hasn't been taken
19 into account?

20 MR. TRIVETT: That is correct. And that
21 certain of the alternatives don't have necessarily the
22 same default. It's not easy to get at those. I think
23 there is a clear judgment that has to be made.

24 MRS. FORMUSA: With respect to the
25 question of microwave towers and DESN stations, we are

1 not seeking any approvals for those matters in this
2 application. If we were to get into the details of the
3 design of every aspect of the existing system, I do not
4 see the relevancy of looking at design in minute detail
5 for ever aspect of the existing system.

6 With respect to existing fossil, nuclear
7 and hydraulic facilities, we have said that the option
8 panels will deal with existing system experience, and
9 that would include the design of those stations to the
10 extent that they are relevant to the choice of future
11 options.

12 But with hydraulic facilities, for
13 instance, were built in the early 1900s. I hope that
14 technology has progressed since then. I trust it has.
15 The design wouldn't necessarily be the same.

16 But I think the option panels will
17 helpful with respect to design issues for future
18 options. But for microwave and DESN stations, I have
19 lot of difficulty seeing the relevancy see of those
20 two, the aspects of design for those two matters in
21 this application.

22 THE CHAIRMAN: Perhaps if you have
23 specific concerns with respect to the existing system,
24 you might address those concerns to this panel and see
25 how you get along on that basis.

1 MR. TRIVETT: Thank you. If I might just
2 have a minute, Mr. Chairman.

3 We will then come back to that point
4 later in a better arrangement perhaps, and make it
5 easier to deal with, Mr. Chairman.

6 THE CHAIRMAN: Fine.

7 MR. TRIVETT: Q. One part of existing
8 system which, as far as I know, has not yet been
9 referred to, and I suppose this might be a question to
10 you, Mr. Barrie, but I really don't know just who to
11 direct it to.

12 It has to do with the term "pump
13 generation." And different people use different terms
14 to refer to this. Some call it "pump generation" and
15 some call it "pump storage." I don't know which one
16 you use in Hydro. I suppose it doesn't really matter.

17 But, I wondered if you could tell us,
18 first of all, what amount of such pump generation you
19 have in the existing system?

20 MR. BARRIE: A. We have a pump
21 generating facility associated with the Beck complex.
22 That's the only one that I know of. When it's
23 generating it's currently limited to about 150
24 megawatts.

25 DR. CONNELL: When it's storing, how much

1 does it consume?

2 MR. BARRIE: There is a turnaround
3 efficiency of around 70 to 80 per cent, something like
4 that. So, to get 150 megawatts of generation, you have
5 to pump at 180 megawatts, 190 megawatts, something like
6 that.

7 Perhaps it's not correct that I should
8 use megawatts. Again, I should really use
9 megawatthours of generation and pumping. But it's of
10 that order.

11 MR. TRIVETT: Q. Now, is this facility,
12 as presently used, used for peak generation?

13 MR. BARRIE: A. The typical operation of
14 the pump generating facility is that we pump at night
15 when demand is at its lowest, and we generate during
16 the day especially over the peaks. So, yes.

17 Q. Is it also used for system frequency
18 stabilization?

19 A. Not usually.

20 Q. Is it capable of that use if required
21 at Beck?

22 A. Well, any generating unit that
23 responds to system frequency does assist in maintaining
24 system frequency. So, to that extent, yes.

25 Q. Is the same true in terms of the use

1 of spinning reserve?

2 THE CHAIRMAN: I am sorry?

3 MR. TRIVETT: Spinning reserve. Maybe
4 that needs to be defined. I don't know if it has been.

5 MR. BARRIE: I did mention that in my
6 direct evidence.

7 This is the reserve that we have. The
8 difference between the megawatts being generated at a
9 unit and the maximum capacity of that unit, we refer to
10 as spinning reserve. To that extent, yes.

11 MR. TRIVETT: Q. Can you give it any
12 percentage rating in that?

13 MR. BARRIE: A. Percentage of what?

14 Q. Of the reserve requirement?

15 A. The system requirements, it's very
16 little. We have a certain requirement from the point
17 of view of the whole system, spinning reserve
18 requirements, very little of that would be supplied by
19 the pump storage unit.

20 Q. That would be due to its size, but in
21 terms of how you would rate the capability of Beck 2?

22 A. How I would rate the capability of
23 Beck 2?

24 Q. Yes. The reserve.

25 A. If you take the whole Beck complex,

1 then Beck provides a large part of our spinning
2 reserve. It provides both immediate spinning reserve
3 and automatic generation control.

4 So, the whole Beck complex is a very
5 critical factor in all of those issues that you have
6 mentioned, frequency control, spinning reserve and what
7 I have just mentioned, automatic generation control.
8 But we are now talking about a much bigger plant than
9 just the pump storage. The pump storage is a very
10 small part of the Beck operation.

11 Q. Okay. So, as that plant stands
12 today, as a very small facility, does it give to Beck
13 2, the whole complex, a better capability of filling
14 the criteria that we have been talking about?

15 A. I think it makes negligible
16 difference to the capability, the overall capability of
17 Beck to meet those requirements.

18 Q. Because of the size?

19 A. Yes.

20 Q. Yes. Do you have any reference as to
21 why that pump storage was put in to that facility?

22 A. I don't have any references, no.

23 Q. So, other than the fact that it's a
24 small facility, have you any knowledge of how it has
25 consistently either fulfilled or not fulfilled its

1 requirements? Just what were the requirements that
2 brought about the installation of pump storage in that
3 facility?

4 A. Well, I have to go somewhat on my
5 understanding of how it's used. I wasn't around when
6 it was being designed and built.

7 But essentially it was for the basic two
8 roles that I explained at the beginning. The role of a
9 pump generating unit is to pump at night when cheap
10 power is available from other sources, and to generate
11 during the day when it's of most use to us, normally
12 over the peaks. And it has fulfilled that role,
13 throughout the years, reasonably well.

14 Q. Well, has there been any problem with
15 it or has it worked as expected?

16 A. The units are getting old now and we
17 are having some trouble with availability, but that's
18 to be expected.

19 Q. How does the amount of the pump
20 storage in the Ontario Hydro system compare in quantity
21 with other utilities with which we have been comparing
22 Ontario Hydro, New York, for example?

23 A. I don't know how much New York's got.

24 Q. Mr. Hunter understood, when he was
25 touring the facility yesterday, that they have dials in

1 which they watch New York's pump storage generation as
2 an indicator. Are you familiar with that?

3 A. No, I'm not.

4 Q. Could I have some explanation of how
5 that is used in your control system?

6 A. Yes.

7 MR. TRIVETT: Could we have a number for
8 that, Mr. Chairman?

9 THE CHAIRMAN: You want to know whether
10 they monitor pump storage from New York and why they do
11 that?

12 MR. TRIVETT: What is achieved by that
13 monitoring, yes, why they do it.

14 THE CHAIRMAN: 142.82.

15 MR. TRIVETT: Q. And if you are
16 supplying that, could we have the quantities that they
17 have in their system by comparison?

18 MR. BARRIE: A. So you want the amount
19 of pump storage available in a New York and the
20 monitoring facilities that we have and what we do with
21 it?

22 Q. Yes.

23 A. All right.

24

25

---UNDERTAKING NO. 142.82: Ontario Hydro undertakes to provide the amount of pump storage available in New York and the monitoring facilities and use of such monitoring facilities.

MR. TRIVETT: Q. Now, if we go to Exhibit No. 87, Table 3.3 at page 34, we have set out reserve margin requirements. Now again, I hope that I can understand what I am talking about.

In describing values, do you rate a lower reserve margin with principally hydraulic systems?

MR. TABOREK: A. Hydraulic systems tend to have a lower reserve margin.

Q. Could you explain, is it possible to explain the logic that this follows?

A. Primarily two reasons. The technology has been in existence for some time and it's well-proven, and the other is that the units tend to be smaller.

Q. Then if you added large pump generation, would you have more of a hydraulic system with the associated reduction in reserve margin?

A. Could you say that again, please?

Q. If you added large pump generation, would you have more of a hydraulic system with the associated reduction in reserve margin?

A. I don't understand the latter part of

1 your question.

2 Q. Well, I understood we just
3 established that you have a lower reserve margin with a
4 principally hydraulic system.

5 A. Yes.

6 Q. So, if we added pump storage, would
7 we therefore have a lower reserve margin for all in the
8 system?

9 A. That would depend on the
10 characteristics of the pump storage and the
11 characteristics of the demand to be met, and the
12 characteristics of the existing units. So, one cannot
13 give a generic answer to a question like that.

14 Q. If you look then, Mr. Snelson, at
15 page 2714 of the transcript, lines 21 to 23.

16 THE CHAIRMAN: Which volume is that?

17 MR. TRIVETT: Volume 16, Mr. Chairman.

18 THE CHAIRMAN: Thank you.

19 MR. TRIVETT: Q. I don't intend to be
20 unduly facetious here, but your statement was, you can
21 continue to generate hydraulic energy as long as the
22 rivers continue to flow, and I presume we are not
23 suggesting that the natural phenomenon rain has a life
24 cycle. So, if I go on with my question then, if we are
25 not presuming that, then would you agree that pump

1 generation could be called controlled hydraulic without
2 reliance on nature's precipitation like the run of
3 river plants have to do?

4 MR. SNELSON: A. Pump storage is a form
5 of hydraulic generation. It is a net user of
6 electrical energy and not a net producer of electrical
7 energy. So, it's characteristics are very different to
8 those of a hydraulic generating plant.

9 Q. But does the installation of those
10 plants not increase dependability?

11 A. As far as peak capacity is concerned
12 and the reliability of peak capacity based on equipment
13 availability, then one would expect pumped storage units
14 to have forced outage rates similar to hydraulic plants
15 and to be relatively low forced outage rates. But
16 there are also impacts on reliability due to their
17 energy consumption rather than energy production
18 characteristics.

19 Q. So, in part, it depends on what you
20 have available on the system with which to produce your
21 storage?

22

23

24

25

...

1 [12:20 p.m.] A. A pump storage unit depends upon
2 surface energy being available to pump the units, and
3 that surface being greater than the energy required by
4 the pumping masses, which can be of the order of 20 or
5 30 per cent.

6 MR. TRIVETT: Excuse me just a minute,
7 Mr. Chairman.

8 Q. Well, I don't know whether there's
9 been any study of this so I'm not sure whether you can
10 answer the question, but has a comparison been made
11 between the desirability of maneuvering your nuclear in
12 your low-demand periods and, in the alternative,
13 pumping storage for your own use? I find nothing in
14 the DSP on any comparison of this, so there's no way of
15 knowing whether any study has been done.

16 My base question is: Does Hydro have
17 plans for additional pumps generation? And, if not,
18 based on what studies have they decided not to?

19 MR. SNELSON: A. I'll take you to
20 Appendix A of Exhibit 3, which is the Demand/Supply
21 Plan Report, which is -- and Appendix A gives the
22 demand/supply planning strategy which the Demand/Supply
23 Plan is based upon.

24 Specifically, on page A-3 there is a
25 strategy element 3.2.2 under the heading of "load

1 shifting." The strategy says: "The choice between
2 load shifting and energy storage will reflect the cost
3 and benefits of each option."

4 Now, what is intended by that is that
5 load shifting is a demand management option where loads
6 can be shifted from the daytime to the nighttime, which
7 has the similar effect to the system as shifting
8 surplus generation from the nighttime to the daytime.

9 Q. All right.

10 A. Basically, the comparison that we
11 were looking at was between achieving whatever load
12 shifting or generation shifting was required by either
13 doing it as a demand management program or as a pump
14 storage program. The strategy element says that the
15 choice between the two will be done depending on costs
16 and benefits. Our current understanding is that the
17 load shifting is the cheaper option than the pump
18 storage option.

19 Q. But there are no studies presented
20 that show this?

21 A. None in this current set of
22 documentation. You'd have to go back quite a long way
23 in our planning studies to find the documentation that
24 led to that conclusion.

25 Q. Does the reference in that section to

1 energy storage really deal with pump storage? I mean
2 in pump storage you don't really storage the energy.
3 You store the water and reuse it. Is that really
4 saying the same thing?

5 A. That section was intended to deal
6 with various forms of energy storage. And always, if
7 you're storing electrical energy, you store it in some
8 other medium. In this case the storage is by way of
9 water at an elevation, at a height. Other forms of
10 energy storage would storage energy in a chemical form
11 in a battery or some other such form. So, this was
12 intended to deal with pump storage, yes.

13 Q. Is there some study to back this up
14 that we could have?

15 A. I'm not sure how far we have to go
16 back in our files to find such studies. I know there
17 have been such studies in the past, and I can't recall
18 the specifics of them.

19 DR. CONNELL: Mr. Snelson, perhaps you
20 could just tell me by way of a supplementary question,
21 are there any other modalities of storage which are
22 more competitive than pump water storage?

23 MR. SNELSON: At the moment if you're
24 going to store energy on, say, storage on the supply
25 side of the system rather than the demand side, then

1 hydraulic pump storage is the front-runner in that
2 respect.

3 DR. CONNELL: Thank you.

4 MR. SNELSON: People have also done some
5 battery storage projects, but that's demonstration,
6 whereas the pump storage is a commercial technology
7 that's used quite widely.

8 MR. TRIVETT: Q. Does Hydro have any
9 current plans for additional pump storage generation,
10 as far as you know?

11 MR. SNELSON: A. No.

12 Q. Does it own sites required for the
13 purpose of installing pump storage?

14 A. Yes.

15 Q. Where are they located?

16 A. I know of one, specifically, which is
17 in the Collingwood area. I believe it is close to one
18 of the ski areas - maybe Georgian Peaks, but I'm
19 stretching my memory a bit there - and the scheme would
20 involve an elevated reservoir at the top of the Niagara
21 Escarpment as the upper reservoir and Georgian Bay as
22 the lower reservoir.

23 I believe it has the name Delphi Point as
24 the--

25 Q. That's the one I've heard of.

1 A. --name given.

2 Q. And, as far as you know, that's the
3 only one that you know of?

4 A. That's certainly the largest one. I
5 recall some talk of one in the northeastern region that
6 was much smaller, and I can't recall the specifics of
7 that.

8 Q. Could you undertake to let me know if
9 there are other locations?

10 A. Yes.

11 Q. And where that northeastern region
12 one might be?

13 A. Yes.

14 MR. TRIVETT: Would that be undertaking
15 142.8, Mr. Chairman?

16 THE CHAIRMAN: 83, yes.

17 ---UNDERTAKING NO. 142.83: Ontario Hydro undertakes to
18 provide if there are other sites required
19 for the purpose of installing pump
storage and where the northeastern region
site is; as well as any recent studies in
connection with pump storage.

21 MR. TRIVETT: Q. Can you tell us what
22 stage of design or development these sites are at?

23 MR. SNELSON: A. They are very, very
24 preliminary, if at all. They're not in any development
25 process at this time. As I said, we have no plans to

1 develop Delphi Point. So, there are no engineering
2 studies of any sort under way with respect to it.

3 Q. Are there any recent studies in
4 connection with pump storage?

5 A. There have been some studies within
6 the last ten years or so.

7 Q. Are they in a condition where they
8 could be supplied?

9 A. We can inquire into what the status
10 is. I'm sure there are some that can be found to meet
11 that request.

12 Q. If that's something that's reasonable
13 to supply, could you undertake to supply it?

14 A. To the best of our ability, we will.

15 THE CHAIRMAN: We can include that in the
16 142.83.

17 MR. TRIVETT: Certainly.

18 Q. Mr. Hunter was enquiring how long you
19 had the Delphi Point site. Do you know that?

20 MR. SNELSON: A. I don't know.

21 Q. I guess you could supply that along
22 with the other information about the pump storage --

23 A. We can inquire into it.

24 Q. Pump generation, as such, is really
25 not discussed in the D/S plan; correct?

1 A. It was discussed, I believe, in the
2 development of the demand/supply planning strategy.

3 Q. Is that a document that we have
4 available?

5 A. There are numerous exhibits relating
6 to the development of the demand/supply planning
7 strategy and...

8 Q. There is report 87360 that has some
9 brief discussion on page 144, if that was the one you
10 were thinking of -- design development report No.
11 87360?

12 A. What is the title of that document?

13 Q. Hydro Electric Power Resource of the
14 Province of Ontario, report No. 87360?

15 A. That would one document. It was not
16 the one I was thinking of.

17 Q. October of '87?

18 A. I'm having difficulty finding one,
19 which is surprising because there should be several of
20 them.

21 Q. Well, this is the last question I
22 have in this section, Mr. Chairman, so perhaps --

23 A. The documents I was referring to,
24 primarily, would be Exhibits 66 and 67. The discussion
25 of pump storage in there would be quite short, I

1 believe, but there would be some discussion.

2 Q. Yes, as is the one in the one I was
3 referring to. Not really discussion on the basis of
4 which anyone would decide one way or another, really?

5 A. I'd have to go back and review
6 Exhibit 66 and 67 before I would agree to that.

7 MR. TRIVETT: Mr. Chairman, I start a new
8 section at this point, which has to do with the
9 material with which we supplied you, and it may be
10 rather long. I wondered if you would want to
11 consider --

12 THE CHAIRMAN: Well, we had better keep
13 going until one o'clock.

14 MR. TRIVETT: Until one o'clock? All
15 right.

16 MR. CHAIRMAN: We'll stop at one o'clock.

17 MR. TRIVETT: If we turn then to Volume
18 page 2787, transcript line 24, Mr. Chairman.

19 Q. Mr. Barrie, I believe this is your
20 examination in chief. You've stated:

21 "Probably the best way to demonstrate
22 the kind of unforeseen events that occur
23 is to take a sequence of events that
24 occurred on the Thanksgiving weekend,
25 of October the 6th to 8th, and October

1 9th of 1990."

2 Now, we supplied you with some copies of
3 the daily load summary sheets for those dates.

4 I wondered if you would explain the first
5 chart, page number 1, and the accompanying printout,
6 page 2, which I understand is the actuality on the
7 reverse side of the chart, as those charts are kept by
8 Ontario Hydro.

9 Now, do I understand you receive copies
10 of these charts on a daily basis?

11 MR. BARRIE: A. Yes. These charts --

12 THE CHAIRMAN: Perhaps, Mr. Barrie, are
13 you familiar with these charts that you're being shown?

14 MR. BARRIE: Yes. I didn't provide these
15 charts.

16 THE CHAIRMAN: No. No. But you're
17 familiar with them?

18 MR. BARRIE: I've seen these charts, yes.

19 MR. TRIVETT: Should this package be made
20 an exhibit at this point, Mr. Chairman?

21 THE CHAIRMAN: Perhaps it should.

22 THE REGISTRAR: 174, Mr. Chairman.

23 THE CHAIRMAN: 174.

24 ---EXHIBIT NO. 174: Copies of the daily load summary
25 sheets for October 6th to 9th, 1990.

1 MR. TRIVETT: Thank you.

2 MR. BARRIE: These charts are provided by
3 the system control centre to the head office giving a
4 daily summary of what occurred, how the hour-by-hour
5 demand was met in the previous day.

6 MR. TRIVETT: Q. Am I correct that the
7 small vertical line, which is shown in this first chart
8 somewhere around 9 -- oh, I see. It's shown in the box
9 at 10.10, can you tell us what that represents?

10 MR. BARRIE: A. Well, as the box says,
11 that's time of peak, the peak demand that occurred
12 during that 24-hour period.

13 Q. The line as shown on the bar chart
14 coincides with the time of peak as shown in the box?
15 This is true for each of the charts for the four days
16 to which you referred; is that correct?

17 A. This is a hand-drawn chart, and it
18 would appear the person drawing it indicates, with just
19 a mark, where the peak occurred. That seems to be
20 correct everywhere except I notice on Wednesday the
21 10th the mark appears to be one hour after the actual
22 peak. That might have been a slip of the hand. It's a
23 hand-drawn chart, as I say.

24 Q. Yes.

25 A. But I think that's the intent anyway.

1 Q. Yes. Now, on page 2789, line 3 of
2 your transcript, it reads: "...so we lost a further
3 500 megawatts." And I've been unable to find a
4 reference to having lost some earlier amount, though it
5 seems to me that in what you were describing that you
6 had recorded an initial loss. It may be that the
7 transcript has omitted something there?

8 A. I think what my evidence was trying
9 to show was over a period of three day we lost a
10 substantial amount of generation.

11 Q. I see. So, it wasn't necessarily a
12 specific time of losing it?

13 A. No. Well, I think the previous lines
14 indicated where the losses occurred.
15
16
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25

...

1 [12:45 p.m.] Q. Well, at line 18 you say:

2 "The weekend went approximately as
3 predicted. We had a comfortable surplus
4 and we made profitable sales to the
5 Americans. The situation changed on
6 Monday when, first, the weather forecast
7 changed. It had been a very, very
8 pleasant weekend, but this was now
9 forecast to change, and demand on Tuesday
10 was now forecast to be some 650 megawatts
11 higher. Again, on Monday, a unit at
12 Lambton was forced out of service because
13 of a boiler tube leak, so we lost a
14 further 500 megawatts."

15 A. I think the reference was to the fact
16 that demand had increased by 650. It wasn't actually a
17 previous loss of generation. It was just adding to our
18 deficiency.

19 Q. Well then, if we look at the chart we
20 see that on the summary chart for October 6th, at 1500
21 hours to 1600 hours, there appears to be a sharp
22 decline of about 800 megawatts, and would this be the
23 representation on the chart of that unit going down to
24 which you refer?

25 A. Yes. The bottom line is the thermal

1 generation.

2 Q. Right.

3 A. So, that sudden loss there, 1500
4 hours on Saturday...

5 Q. Now, if we move to Sunday--

6 A. Before we move on. We are mixing up
7 two things here. The reference in the text here in my
8 testimony is to Monday, the loss of a unit.

9 Q. Right.

10 A. We are looking at Saturday's chart
11 here.

12 Q. Then what would the explanation be
13 for that drop on the Saturday?

14 A. This was actually not dealt with in
15 my testimony, but it was actually looking at some
16 hourly production data sheets I have. It was actually
17 a drop at Bruce there.

18 Q. Does that reflect a unit going off,
19 or something like that?

20 A. Yes, Bruce Unit "A" stopped
21 generating sometime between 15 and 1600.

22 Q. And that's just a normal hour of the
23 day response?

24 A. No, there was a problem. It came off
25 and it came back on at 1900 hours.

1 Q. I see. That's reflected in the
2 chart.

3 A. I think you can see it on the --

4 Q. Yes.

5 Is it unusual for nuclear units to go off
6 and go on in that kind of period of time? I thought
7 when they went off line, they were off for some time.

8 A. Usually with a nuclear unit, it
9 either comes back quickly or as we described earlier--

10 Q. Yes, the number of hours.

11 A. --we could have this phenomenon of
12 poisoning-out.

13 Q. Yes.

14 A. In this case, now I don't know what
15 the specific problem was in this case, but it looks
16 like they were able to bring it down and bring it back
17 up without that poisoning-out occurring. I don't know
18 what the specific problem that brought it up in the
19 first place was.

20 It wasn't obviously significant to the
21 overall operation that weekend. We had a lot of spare
22 capacity, as I mentioned, on that particular day.

23 Q. We had just been wondering if that
24 was what you were referring to what you spoke about the
25 "further" but not necessarily.

1 A. I don't think it was.

2 Q. It doesn't surprise you that it would
3 be back on, that's the kind of a period that would
4 elapse before there would be a poisoning-out?

5 A. That sequence of events does not
6 surprise me.

7 Q. It's a normal sequence of events.

8 Thank you.

9 Now, if we turn to Monday, October 8th,
10 to the part of the transcript referred to 500
11 megawatts, does that chart show that loss occurring in
12 the 13th hour on the graph?

13 A. I think so, but I will have have to
14 check the actual data for the Monday.

15 Yes.

16 Q. Then if I draw your attention to
17 October 9th, there seems to be a drop of perhaps some
18 400 megawatts in the eleventh hour. Is this what you
19 were referring to in your evidence on page 2791, 10:22?

20 A. Yes, Unit 8 at Bruce.

21 Q. Now, the chart appears to show only
22 400 megawatts. Would I be right to suggest that
23 because of the loss of thermal generation occurring at
24 22 minutes into the hour, the average for that hour, as
25 it appears in this chart, will be a little less than

1 half the total value of the loss?

2 A. Could you repeat that, please?

3 Q. The chart appears to show only 400
4 megawatts, would I be right to suggest that because of
5 the loss of thermal generation occurring at 22 minutes
6 into the hour, that the average for that hour as it
7 appears in this chart would be a little less than half
8 the total value of the loss?

9 The calculation I have here is 22 over 60
10 by 850 equals 320.

11 A. I think that's approximately correct,
12 if you assume an instantaneous loss of power.

13 Q. If we return to October 8th then, it
14 would appear that the 500 megawatt loss at Lambton
15 happened sometime between 12:15 and 12:25? Does that
16 appear to be the proper interpretation of the summary
17 chart?

18 A. In all these cases, taking this graph
19 and making that kind of assumption can be misleading.
20 It depends on the nature of the problem.

21 If it's a problem that causes an
22 instantaneous loss of generation and you assume that
23 the generation was doing full load at the time, then
24 you can do that kind of calculation.

25 It may be that it's a kind of problem

1 where it causes to ramp the unit down over a period of
2 time, in which case that kind of calculation wouldn't
3 be relevant. If fact, it would be misleading. So, in
4 each of these I have to treat that calculation with
5 some caution.

6 Which one were you looking at?

7 Q. If you look at the one on the 8th,
8 that's the 500 megawatt loss between 12:15 and 12:25.

9 A. Yes. This is a good example which,
10 in fact, demonstrates what I am putting forward.

11 The previous hour, the hour finishing at
12 1100 hours, that Lambton unit was available for 500
13 megawatts, it was actually generating 300 megawatts at
14 the time. This was a boiler tube leak. They would
15 ramp the unit done fairly quickly depending on what
16 else was happening on the system and how severe the
17 boiler tube leak was. In this case they did it, it
18 didn't generate anything in the hour finishing 1300
19 hours.

20 Q. What would be the ramping rate?

21 A. I don't know what it was in this
22 particular occasion.

23 Q. That would be a different type of
24 record?

25 A. Sorry?

1 Q. That would be a different type of
2 record? Not something you can judge from this?

3 A. Not from the data I have in front of
4 me here, no. It would ramp down fairly quickly, I
5 imagine, with a boiler tube leak, but it does depend on
6 the severity of the tube leak and the what other
7 resources were available on the system at the time.

8 Q. Well then, would it be possible for
9 you to give us the ramping rate that was used there?
10 We do have certain interrogatory information and we
11 want to see if it compared.

12 A. You want to know on this particular
13 instance--

14 Q. Yes.

15 A. --how fast we brought that unit up?

16 Q. That's right.

17 A. I don't know if that information is
18 available. I will attempt to get it.

19 MR. TRIVETT: Thank you.

20 Could we assign that a number, Mr.
21 Chairman.

22 THE CHAIRMAN: 84, is it.

23 MR. TRIVETT: That's 142.84.

24 ---UNDERTAKING NO. 142.84: Ontario Hydro undertakes to
25 provide how fast the Lambton unit was
brought up.

1 MR. TRIVETT: Q. We Return now to
2 October 6th. The same period appears to suggest a loss
3 of generation, assuming 850 megawatts, occurred between
4 1500 and 1510. Is this an accurate interpretation?

5 MR. BARRIE: A. I thought we already
6 covered that one. Yes.

7 Q. How long would it take the operators
8 to correct for these losses?

9 A. Do you mean at the station or the
10 system operators?

11 Q. The system operator.

12 A. The system operators would respond
13 immediately. We would have some spare capacity. We
14 would have some assistance immediately from the tie
15 lines if we needed it. So, there is an immediate
16 response and the generation is made up immediately.

17 Now, the way the load is picked up by the
18 various generators may not be the way we want to leave
19 things, so then we would manually redispatch to get
20 things back to the way we wanted it.

21 Q. I understand.

22 Can you say what the time frame is in
23 that process? Does it vary with the different
24 circumstances?

25 A. We strive to get back to normal, if I

1 could use that, normal operation, normal situation
2 within 10 minutes of any such incident occurring.

3 Q. Thank you. So, are you saying that
4 in this situation we did get back to normal in 10
5 minutes or did you include that in your study of the
6 example that you were giving?

7 A. I am sure that in this instance we
8 did get back within 10 minutes because in this
9 particular day, we not only had the normal reserve that
10 we always keep, but we had a lot of spare capacity on
11 this particular day. So, I am sure this incident did
12 not cause us any major or heartache in terms of the
13 instantaneous effect of it.

14 Q. Now, you describe that at line 4 on
15 page 2791 as a position that became critical. Is it a
16 critical situation when you have that much excess
17 capacity?

18 A. You have moved to a different day
19 now.

20 Q. Yes.

21 A. We are now on the Tuesday morning
22 with a totally new operating situation, as I described
23 in my direct evidence, demand was much higher. That
24 had been the long weekend so everybody was back to
work, the weather was bad, we had lost plant during the

1 weekend as I described, we faced transmission
2 limitations, we had some problems at the fossil
3 stations as well, so we were in a totally different
4 situation on the Tuesday as we had been over the
5 weekend. I think that was the whole gist of my direct
6 evidence.

7 Q. That's right. Yes.

8 A. So, now, when we lost an 850 megawatt
9 unit now, this was a much more serious position than it
10 had been than losing a unit over the weekend.

11 Q. Well then, on that date you moved
12 again to stabilize the situation. Can you state how
13 that stabilization was achieved?

14 A. Immediately this event occurred we
15 would get some assistance from our neighbours,
16 immediately.

17 At the same time, the existing units that
18 were on line would respond, our own units that is, to
19 provide more power. That happens automatically.

20 Now, manual intervention involves
21 instructing all other available generation to make up
22 the deficit. Unfortunately, in this situation, all we
23 had left was the combustion turbine units and we had
24 some spare capacity on our hydraulic generation. So,
25 those were the actions that the operators took

1 immediately.

2 Q. And in normal operation there is
3 normally always that hydraulic reserve being
4 maintained?

5 A. We always remain a certain amount of
6 reserve which can respond in 10 minutes and a certain
7 amount which can respond in 30 minute.

8 Q. Which was referred to before when you
9 were talking about the 10 minute reserve?

10 A. That's right. But this loss was of a
11 magnitude that is at the upper end of our criteria.

12 If you will recall, we maintained
13 sufficient 10 minute reserves to guard against the loss
14 of this single biggest generating unit.

15 Q. Yes.

16 A. The 850 megawatts was fairly close to
17 the biggest generating unit, if not the biggest
18 generating unit on line at that time.

19 Q. Now, in this section, could you do a
20 comparison for me between the loss of, say, 2200
21 megawatts of generation and the loss of 2200 megawatts
22 of load, which of these is the greater problem faced by
23 a system?

24 A. Where does 2200 come from?

25 Q. Well, if you go back to page 2792

1 lines 4 to 9, you state that you lost 3,000 megawatts
2 of generation and over 700 megawatts of load. That is
3 a net loss of 2200.

4 A. Is it? It's 2300; isn't it?

5 Q. Well, we took it it was over 700 that
6 you said.

7 A. Okay. Well, in this kind of
8 situation, so we have now moved away from --

9 Q. Yes.

10 A. We are now looking at a loss of
11 generation beyond the criteria that we have?

12 Q. Right.

13 A. We have our criteria. This is
14 something worse than our criteria occurring.

15 The loss of either can put a severe
16 strain on the power system.

17 I think loss of generation is probably
18 most severe. Immediately this happens, there is an
19 in-rush from our neighbours, so we are not only putting
20 ourselves under stress, but we are stressing the whole
21 interconnection. To that extent, I think generation
22 loss would be more severe but you can postulate
23 situations where a sudden loss of demand where you put
24 yourself into a large excessive generation, can also
25 cause you problems, can cause stability problems. ...

1 [1:03 p.m.] Q. Does that depend somewhat on what the
2 source is of the energy that's being produced?

3 A. If the source is fast-acting and can
4 quickly reduce, then that's a better situation than
5 having something that's very rigid.

6 Q. Your hydraulic would have that
7 greater response capability?

8 A. In general hydraulic can respond
9 faster than anything else, yes.

10 MR. TRIVETT: Perhaps it would be a good
11 time to leave it.

12 THE CHAIRMAN: We'll adjourn now until
13 2:30.

14 THE REGISTRAR: The hearing adjourned
15 until 2:30

16 ---Luncheon recess at 1:05 p.m.

17 ---On resuming at 2:30 p.m.

18 THE REGISTRAR: Please come to order.
19 This hearing is again in session. Please be seated.

20 MRS. FORMUSA: We have some more
21 transcript undertakings to file.

22 THE CHAIRMAN: Yes?

23 MRS. FORMUSA: 142.9, 142.15(a)

24 THE CHAIRMAN: Wait a minute. Let me
25 just make a note here. Yes?

1 MRS. FORMUSA: 142.19.

2 THE CHAIRMAN: Yes.

3 MRS. FORMUSA: 142.48, 142.52 and .53,

4 142.59, 142.60(a), (b), (c) and 142.62. I've made
5 copies for the Clerk and copies will be given to those
6 intervenors who asked for the undertakings.

7 THE CHAIRMAN: Thank you.

8 THE REGISTRAR: Do you have these yet,

9 Mr. Chairman?

10 THE CHAIRMAN: No, I don't. Thank you.

11 Mr. Trivett?

12 MR. TRIVETT: Thank you, Mr. Chairman.

13 Q. Now, Mr. Barrie, I'd like to draw
14 your attention to the daily load summary, page 11 of
15 the material which we supplied you. That's the January
16 25th, 1991. There's a Friday and there's a Saturday.

17 THE CHAIRMAN: I think it would help me,
18 speaking for myself alone, as to what these charts
19 we've been going over for the last half hour are
20 intended to demonstrate in the context of this hearing.

21 MR. TRIVETT: Well, we're just coming to
22 the comparison in the chart that's before you, Mr.
23 Chairman.

24 THE CHAIRMAN: We have the weekend and
25 now we're going to some January dates, but it just

1 would help me in hearing the evidence to know what it
2 is that you're demonstrating by these charts, what
3 point is it that you're making on behalf of Mr. Hunter?
4 That's, I think, what's puzzling me.

5 MR. TRIVETT: Mr. Chairman, we're trying
6 to demonstrate what the emergencies look like in these
7 charts and do a comparison between the example which
8 was given by Mr. Barrie in his chief and this example
9 which we are now coming to, which has a totally
10 different origin, I believe.

11 THE CHAIRMAN: But these charts show the
12 thermal generation and the peak demand, and they show
13 an analysis on a daily basis of how the demand was met.
14 I'm just not quite sure what point it is you're trying
15 to make.

16 MR. TRIVETT: Well on the one that we're
17 coming to now I believe that the source of the
18 variation that these charts show is entirely different
19 from the example that Mr. Barrie gave to us, and we
20 wanted to ask about this particular example and how
21 that reflects the operation of the existing system.

22 THE CHAIRMAN: Well, I'm not sure I
23 understand completely why you can't ask him that
24 question. He gave the example of the weekend. It's
25 just an example of how you meet load problems, which

1 they were lucky enough, in his view, to successfully
2 meet without any great difficulty.

3 But I'm not quite sure what it is that
4 you're saying or what Mr. Hunter is saying, or you're
5 saying on behalf of Mr. Hunter, that this
6 cross-examination is directed to.

7 That's what I'm having some difficulty
8 with. Perhaps if you have that concern, maybe you
9 could ask the panel about them and they can perhaps
10 help you.

11 MR. TRIVETT: The variation which we are
12 coming to, Mr. Chairman, is a much greater emergency-
13 appearing situation, but it has a totally different
14 explanation, I believe.

15 THE CHAIRMAN: All right. Well, try to
16 keep it --

17 MR. TRIVETT: That is why we're bringing
18 it out. There are questions about system capacity that
19 relate to this example.

20 THE CHAIRMAN: Well, perhaps you could
21 direct your questions along those lines and maybe Mr.
22 Barrie can help you with that.

23 MR. TRIVETT: Thank you.

24 Q. Well you have a copy of the chart
25 before you for January 25th, Mr. Barrie?

1 MR. BARRIE: A. I do.

2 Q. In the lower left-hand corner of this
3 chart, which is page 11 in the material which we
4 supplied, the box says under the title of "Time of
5 Peak" at the bottom, and then at the top we have a
6 legend "Total Demand" and the bottom "Thermal
7 Generation."

8 Now, on this particular day at 8:35,
9 there is a peak which is reported in the box which on
10 most days is the peak for the day.

11 A. Yes.

12 Q. But on this particular chart there is
13 at 2230, the usual demarcation of when the peak
14 occurred. And then on Saturday the 26th the time of
15 the peak is 1750 and on the data sheet it's 1750?

16 A. Yes.

17 Q. The question then is: On the 26th
18 why does the chart show the hourly average higher in
19 the 19th hour than in the 18th hour in which the peak
20 occurred?

21 A. Because the chart on January the 25th
22 is incorrect.

23 I was given these charts on Monday.

24 Q. Yes?

25 A. I had never seen them before. So,

1 yesterday I spent the day trying to verify the charts
2 and the numbers. I discovered that the numbers on
3 January the 25th for the latter part of the day are
4 incorrect.

5 Q. So, is there an alternative record of
6 what actually did occur on the afternoon of the day?

7 A. Yes. I have the correct one in front
8 of me.

9 Q. What was shown here really would be
10 rather impossible?

11 A. I've never seen a load shaped like
12 that, like the original curve there, with a sudden
13 pickup in demand of some 5,000 megawatts or something
14 in --

15 Q. You didn't see how you could ramp up
16 to that sort of thing?

17 A. Yes, I don't know -- since I didn't
18 provide you with this data, I was unable to verify it.
19 So, now having checked the figures, I'm telling you
20 they're wrong. I can give you the numbers for each
21 hour, if you will.

22 Q. Yes.

23 A. Up until 1800, it's correct. Then
24 this is the hour ending I'm giving you.

25 Q. Right.

1 A. 1900 was 22.4; 2000 was 22; 2100 was
2 21.4; 2200 was 20.8; 2300 was 19.8; and 2400 was 18.7.

3 So there's the normal fallaway of demand
4 that we see every evening having passed the 1800 peak.

5 Q. Occurred on that day also?

6 A. Yes.

7 THE CHAIRMAN: Did you happen to check
8 whether the figures in the box at the left were
9 correct?

10 MR. BARRIE: Yes. The figures on the box
11 on the left are correct.

12 THE CHAIRMAN: Which shows a peak
13 megawatt of 22593.

14 MR. BARRIE: 22593 at 8:35 a.m.

15 THE CHAIRMAN: That's in the morning.

16 MR. BARRIE: Yes. By putting those new
17 figures in, Mr. Chairman, this peak late in the evening
18 disappears and the morning becomes the peak.

19 Incidentally, if I could just add, we
20 mentioned this morning about the small mark that's put
21 on the peak every day, and I observed it on some days
22 it's not exactly on the peak. That's because we're
23 indicating the 20-minute peak.

24 ...

1 [2:46 p.m.] So, you'll find on one particular day, I
2 think the Wednesday, the peak was actually just the
3 hour previous to where it appears to be on the graph.
4 It's possible to have a 20-minute peak outside of that
5 one-hour peak. It's usually immediately adjacent to
6 it.

7 MR. TRIVETT: Q. Well, there is, now
8 that you have explained that there is an error because
9 there is an error in the accompanying sheet also which
10 we noticed under the daily averaging. It shows CFS at
11 the bottom, and I suppose that is supposed to be CMS?

12 MR. BARRIE: A. Where is that? Sorry?

13 Q. At the bottom of daily average. In
14 the accompanying page 12 on the hydraulic data for the
15 25th.

16 A. No, what this means is all the
17 numbers here are CMS, cubic metres per second.

18 Q. Yes, then at the bottom should be
19 CMS?

20 A. No.

21 Q. No?

22 A. With the exception of Niagara. We
23 always express Niagara in CFS.

24 Q. Is that right?

25 A. Because it makes for common dealings

1 with the Americans.

2 Q. I see.

3 A. However, there is no numbering
4 against it. That is where the asterisk is.

5 Q. Is it the same thing, too, at
6 Saunders? Or is that not shared?

7 A. That is CMS

8 Q. It is CMS. That is just a
9 historical...

10 A. It is because we are dealing with
11 Niagara River Control. Niagara River control, a joint
12 effort between ourselves and Americans, look after all
13 waterflow over the Falls and the diversions both to
14 ourselves and the American stations. They have always
15 dealt in cubic feet per second, so that is why it is
16 maintained that way.

17 MR. TRIVETT: Perhaps by way of an
18 explanation to you, as you can appreciate, I had not
19 expected had that answer, Mr. Chairman. We had
20 wondered if this had to do with other power being put
21 through the system, but it had not.

22 Q. Do these charts reflect, at all, the
23 transfer of American power through the Canadian system?

24 A. No.

25 Q. Pardon?

1 A. No, not through the system.

2 Q. That is a completely different
3 reporting?

4 A. Power that goes through the system
5 you would not see here. If we were importing or
6 exporting, there would be additional--

7 Q. Yes.

8 A. --for the net.

9 Q. Importing for your own use or
10 exporting for net, but through systems not shown.

11 A. Right.

12 Q. Are there separate charts for that
13 that show what is done in the way of using the system
14 for that kind of throughput?

15 A. We did answer interrogatory on the
16 phenomena knowing as loop flows, which deals with this
17 power being passed through our system, 2.40.95
18 addressed loop flows specifically around Lake Erie,
19 which is the most critical one.

20 Q. Thank you.

21 MR. TRIVETT: I will move on from the
22 questions I had relating to those charts, Mr. Chairman,
23 and that completes the references that we were making
24 to that package of charts.

25 Q. I'd ask you, Mr. Snelson, is there a

1 minimum size unit that Hydro considers for the supply
2 side of its equation?

3 MR. SNELSON: A. No.

4 Q. No? Am I correct in stating that
5 there are some 265 hydraulic units in the system?

6 A. Yes, we believe that is the number.

7 Q. Do you use all 265 in assessing your
8 reliable capacity?

9 A. Yes.

10 Q. Can you tell me how many of the
11 generating units are three megawatts or less?

12 MR. BARRIE: A. It is all in Table 4.20.

13 Q. Table 4.20?

14 MR. SNELSON: A. Table 4.20 gives the
15 size of each generating station's peak capacity in
16 terms of megawatts, and it gives the number of units.
17 So, by dividing the peak capacity by the number of
18 units, then you get a pretty accurate indication of the
19 size of units.

20 Q. On average.

21 A. On average.

22 Q. Mr. Hunter is afraid that the
23 averaging really doesn't work in giving you the
24 results. If you take the examples of Big Chute and
25 South Falls, he says those two will come out

1 substantially above and substantially below, and
2 therefore, you don't get a true count on just
3 averaging.

4 A. Clearly if you have two or three
5 units in the station, and they are different size, then
6 the process we have just described gives you the
7 average size of the units. It doesn't give you the
8 size of each one specifically. Most generating
9 stations do have units of about the same size, if not
10 identical size, but there are undoubtedly exceptions to
11 that rule.

12 Q. The greatest variety would be found
13 in those small stations, would it not?

14 A. Probably.

15 Q. Would it be possible to supply us
16 with an accurate count of the number of units below the
17 three megawatts?

18 MR. BARRIE: A. Do you have an actual
19 one you are interested in? I can give you it right
20 now.

21 Q. Well, we don't really know the names
22 of all those. What we were really after was a list of
23 those that are below that level to work with.

24 THE CHAIRMAN: The number of units that
25 are below three megawatts in capacity, is that what you

1 want.

2 MR. TRIVETT: That is correct, Mr.

3 Chairman.

4 MRS. FORMUSA: Panel 6, I thought, had
5 interrogatories listing the individual unit sizes. I
6 suppose we could give the undertaking, if the answer is
7 given in an interrogatory.

8 THE CHAIRMAN: It is just a matter of
9 counting them up. You just want the numerical, the
10 total, or do you want the list of actual?

11 MR. TRIVETT: We want a list.

12 MRS. FORMUSA: The list showing the unit
13 sizes for each.

14 MR. TRIVETT: Yes.

15 THE CHAIRMAN: That are less than three.

16 MRS. FORMUSA: Yes. 142.85.

17 ---UNDERTAKING NO. 142.85: Ontario Hydro undertakes to
18 supply an accurate count of the number of
units below three megawatts.

19 MR. TRIVETT: Q. Now based on the
20 existing system, what type of generation is most
21 capable of satisfying load following requirements?

22 MR. BARRIE: A. Hydraulic generation,
23 generally.

24 Q. Is there some reason for saying
25 generally? Are there some circumstances in which this

1 is not to be?

2 A. Just the phrase load following. If
3 one means by load following the actual minute by minute
4 variations, then hydraulic is.

5 If you are talking about following the
6 hour by hour load shifts, then a fossil plant is
7 equally capable of doing that.

8 Q. I see.

9 A. So, that is why I said, in general.

10 MR. SNELSON: A. There are
11 qualifications. Hydraulic plants to follow load have
12 to have storage of water set to whatever degree is
13 necessary. During very high flow periods, when
14 following load would mean spilling water that you could
15 otherwise have used to generate electricity, then you
16 will not choose to follow load in hydraulic units.

17 Q. Could you give us a definition of
18 load following that is most commonly used?

19 MR. BARRIE: A. The ability of a
20 generating unit to match the changing demand for load.

21 Q. If you were talking to somebody in
22 another system, would they be understanding you to be
23 talking minute by minute or hour by hour?

24 A. It could be either. It would depend
25 on the context of conversation. We may be talking

1 about a problem, getting down to some minimum load
2 overnight, in which case we'd be talking about the
3 longer-term kind, or we may be talking about our
4 ability to respond quickly to some sudden disturbance,
5 in which case, I'd be talking about the minute to
6 minute. So, it could apply to either.

7 Q. What type of generation is most
8 capable of dealing with the black start after closing
9 down for emergency and for frequency of stabilization
10 of the system?

11 A. They are two different things.

12 Q. Yes.

13 A. So, it is two questions.

14 Q. Two questions.

15 A. The black start, probably a diesel
16 generator.

17 Q. Is there some reason why you wouldn't
18 use hydraulic?

19 A. Combustion turbine units.

20 Q. Pardon?

21 A. Combustion turbine units.

22 Q. In that order?

23 A. They are both capable of providing
24 black start capability.

25 Q. What was used in 1965, when you had

1 the recovery from the shut down?

2 THE CHAIRMAN: What do you understand a
3 black start to mean?

4 MR. BARRIE: A total shut down. You have
5 no power, whatsoever.

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...

1 [3:00 p.m.] Some generating units can pick up load
2 from zero, other places you can't do it. This is why
3 we install a certain black start capability, in the
4 form of combustion turbine units, at our fossil and
5 nuclear generating stations, so they can provide the
6 initial power to start the auxiliaries which allow the
7 main plant to get started.

8 But the reason I am hesitating for the
9 big black out in '65, the situation is different now
10 from what it was then in terms of the black start
11 capability that we have at the fossil stations, for
12 instance.

13 I think in 1965 we were able to restart
14 through hydraulic generation, but I am not certain of
15 that. I don't know what other black start capability
16 we had at that time.

17 MR. TRIVETT: Q. Does hydraulic still
18 give a black start capability, or are there situations
19 in which it does not?

20 MR. BARRIE: A. Hydraulic generation
21 need not give you black start capability. It depends.

22 You have to have certain power available
23 to get generation going. Now, with hydraulic,
24 obviously the requirement is a lot less than the
25 starting of a nuclear or a fossil station, but starting

1 from a black start I am not absolutely sure.

2 I know what the situation is now; I am
3 not sure what it was back in 1965.

4 Q. In the current situation, is this
5 something that's built in to most stations, that there
6 is a preplanned capability to get started again?

7 A. Yes.

8 Q. Now, can you give me a comparison
9 between the spinning reserve capability of the fossil
10 fuel or coal and the hydraulic systems?

11 A. We carry most of our spinning reserve
12 on hydraulic generation. The reason we do that is
13 two-fold.

14 First, it is quicker, it picks up load
15 quickly, so it is effective as spinning reserve. But
16 secondly, it's the most efficient way to run the plant.
17 Hydraulic generation typically is at its peak
18 efficiency at 90 per cent, or thereabouts, full load,
19 of that order anyway. So, we normally refer to running
20 our hydraulic plant at efficiency, which means we are
21 getting the most megawatthours per cubic metre of water
22 that's passed through the plant. So, by running that
23 way you inherently are provided with spare capacity,
24 spinning reserve.

25 Q. Would you explain the use of

1 compressed air in maintaining spinning reserve in the
2 hydraulic plant?

3 A. Compressed air?

4 Q. Yes. I may be wrong, but my
5 understanding is that the air compresses to keep the
6 water down so your units are running though they are
7 not, in fact, generating.

8 A. I don't know what you are talking
9 about.

10 Q. There was evidently some discussion
11 about it at Clarkson yesterday. So, I wonder if you
12 can give me an undertaking to find out what this is
13 about?

14 THE CHAIRMAN: If he doesn't know what
15 it's about, I don't know how he can fulfill the
16 undertaking. He doesn't understand what the question
17 is.

18 The spinning reserve is the difference
19 between your capacity and what you are putting out on
20 to the system; is that right?

21 MR. BARRIE: Yes. And I don't know of a
22 role that compressed air has, but it may do and it is
23 just my ignorance. I am sure experts coming on Panel 6
24 would know.

25 MR. TRIVETT: That's what I was thinking.

1 THE CHAIRMAN: Maybe reserve this for the
2 hydraulic panel.

3 MR. TRIVETT: I would like an answer now,
4 but I will put it over to Panel 6.

5 Q. I was wondering if you could give me
6 a comparison, Mr. Barrie, of what is meant by load
7 following with nuclear, load following with coal-fired
8 and load following with hydraulic. I think I can
9 understand it with hydraulic, I am not sure I can with
10 the others. What is involved in obtaining or moving at
11 a load-following capacity?

12 MR. BARRIE: A. Well, typically a fossil
13 plant can ramp up and ramp down somewhat slower than
14 hydraulic. So on a minute-to-minute basis, as I have
15 already said, probably not as effective.

16 However, what fossil plant can do is it
17 can shut down overnight and typically our fossil plant
18 would run throughout the day 14 to 16 hours. So, it is
19 following the daily load shape in terms of part loading
20 overnight or shutting down, ramping up in the morning,
21 fairly steady all day and then ramping down in the
22 evening. That is a typical load shape for the fossil
23 plant on a weekday, especially.

24 So, it is load following to that extent.

25 With the nuclear plant, since it is our

1 cheapest plant other than our base hydraulic, we will
2 tend to always keep it at full load.

3 Some load-following capability is
4 available with nuclear plant but we use it rarely from
5 the point of view of economics and just the
6 difficulties involved in ramping nuclear units down and
7 back up.

8 We are not able to shut down overnight,
9 the minimum shut down is too long, so typically where
10 we have to - and this is on rare, rare circumstances -
11 we will reduce load at nuclear stations typically at
12 this time of year, over the past two months, as I
13 mentioned, where we have a lot of fresh hydraulic
14 available.

15 So, there is load following at nuclear
16 but to a much more limited extent. We would not
17 normally come down below 80 or 90 per cent of full load
18 at the nuclear stations. Much more typically we would
19 run flat out all the time.

20 Q. In an answer which we had to our
21 Interrogatory 2.35.5, it stated:

22 "Nuclear generating units are not
23 normally used for load following, but are
24 intended operate as base load units.
25 Most nuclear units, however, can be

1 manoeuvred (reduction in output from full
2 load) from their formal operating level
3 typically 5 to 10 per cent, but as much
4 as 50 per cent of generated capacity.

5 There are restrictions to the frequency
6 and duration of manoeuvres made."

7 Now, substantially that is your answer.

8 But I just wonder how you relate this typically 5 to
9 10 per cent, but as much as 50 per cent of generated
10 capacity. You are talking about 80 per cent to 90 per
11 cent, but we are not necessarily talking about
12 percentages of the same thing, I seems to me.

13 A. My 90 per cent would relate to that
14 10 per cent reference there. I was talking about
15 keeping it at 90; they were talking about reducing it
16 by 10 per cent.

17 Q. Okay. Where does the 50 per cent
18 come in?

19 A. That's what the unit is designed to
20 do. As I think we have explained earlier, manoeuvring a
21 nuclear unit has to be done very carefully, and the
22 rate at which you ramp down and the time that it's down
23 at the lower load and the ramp at which you come back
24 up are all very critical parameters that have to be
25 carefully monitored.

1 On a typical overnight manoeuvre we have
2 only have perhaps eight hours that we want the reduced
3 generation for. Perhaps less than that. That would
4 not permit a 50 per cent manoeuvre because of these
5 constraints that I have just mentioned about the
6 ramping rates.

7 So, that is where the 90 per cent would
8 be more typically the kind of number that one would
9 experience.

10 The 50 per cent might be more applicable
11 if you were wanting to ramp down for a weekend, say for
12 36 or 48 hour period. But to the best of my knowledge,
13 that's not something that we do.

14 The 90 per cent is much more typical.
15 That may be because we don't need to come down as low
16 as 50 per cent. I am not saying that we couldn't do
17 it.

18 Q. But it is more critical so you stay
19 away from it, in any event?

20 A. Yes. And you couldn't do it on an
21 overnight.

22 Q. At that ramp down to 50 per cent, you
23 are losing your efficiency too, I would take it.

24 A. The efficiency of the reactor?

25 Q. Yes. I mean, if its efficiency is in

1 the 90 per cent range, what is it in the 50 per cent
2 range?

3 A. I don't know what the relative
4 efficiencies are.

5 Efficiency isn't the primary driving
6 force in the constraints I have mentioned.

7 Q. Safety is the primary or critical
8 movement?

9 A. It's the physics of the reactor
10 itself.

11 Q. Now, could you give me the ramp rates
12 that are associated with those methods of nuclear and
13 fossil?

14 A. I don't have them at my fingertips.
15 We have two specialist panels on fossil and nuclear
16 coming.

17 Q. Okay. Is there a distinction between
18 the person involvement, the need for individuals to be
19 controlling the critical movement in the nuclear and
20 the fossil that is absent from the same action in
21 hydraulic?

22 A. There are certainly a lot more people
23 involved in manoevring nuclear and fossil units than
24 there are in hydraulic.

25 Q. Would it be correct to say that

1 hydraulic reacts itself, without intervention, or does
2 it always require person intervention?

3 A. There are three things that can cause
4 any generating unit to change its output. There is the
5 immediate reaction that happens when there is a change
6 in frequency, that's what we talked about when there is
7 a sudden loss of generation.

8 There is automatic generation control,
9 which a control scheme coming from the control centre
10 to selected plants, which is slower than the immediate
11 but it's still happening within seconds. That's
12 maintaining the tie lines at the appropriate agreed
13 interchange.

14 And thirdly, there is operator
15 intervention.

16 So, the first one is immediate, the
17 second one happens within seconds and the third is
18 within minutes.

19 Q. The operator intervention is required
20 in the nuclear and the fossil, in all cases?

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...

1 [3:15 p.m.] A. What I have described would happen to
2 all three, except we don't have automatic generation
3 control on nuclear, but all three types of generator do
4 respond immediately to system requirements. Both
5 fossil and hydraulic can be assigned automatic
6 generation control, and all three would respond to
7 manual intervention.

8 Q. Thank you.

9 In relation to the pump generation
10 operation, Mr. Barrie, how long does it take the
11 facility that we use here in Ontario to go from pumping
12 to generation?

13 A. Typically about 20 minutes.

14 Q. Okay.

15 MR. TRIVETT: All right. Finished here,
16 Mr. Chairman.

17 Q. My last set of questions may be for
18 you, Mr. Snelson, and they have to do with something
19 which is called "overhead allocation procedure." Do
20 you understand that?

21 THE CHAIRMAN: Overhead allocation
22 procedure?

23 MR. TRIVETT: Yes.

24 THE CHAIRMAN: Is that a phrase that's
25 meaningful to you?

1 MR. SNELSON: I have some understanding
2 of what that phrase might mean, but it might mean
3 different things to different people.

4 THE CHAIRMAN: Well, perhaps you could
5 say what you think it means to you.

6 MR. SNELSON: We do have, in preparing
7 cost estimates for future alternatives, we do allocate
8 a portion of the company's overheads to the cost of new
9 options. We allocate that portion that we feel is
10 appropriate and is incremental because of the
11 activities associated with the new option. That is
12 really a costing concept for Panel 3 and a detailed
13 costing and cost estimating issue for all of the panels
14 where cost estimates will be discussed, which is,
15 principally, Panels 8 and 9.

16 THE CHAIRMAN: You don't make an
17 allocation for existing systems?

18 MR. SNELSON: Obviously overheads have
19 various reasons to be allocated to existing system for
20 various accounting and reporting purposes, but they
21 don't come into planning.

22 THE CHAIRMAN: So, you were speaking as a
23 planner when you gave that definition then?

24 MR. SNELSON: That's correct, and that's
25 the sense in which allocation of overheads is of

1 relevance to the proposals that we are making, in my
2 mind.

3 THE CHAIRMAN: But, in either case, it
4 seems to me, Mr. Trivett, this is a cost matter.

5 MR. TRIVETT: Yes. That's why I'm
6 wondering whether the rest of these aren't all
7 questions that might best be put over to the other
8 panels, Mr. Chairman.

9 THE CHAIRMAN: They do have, as you say,
10 this relationship to the planning function, but
11 nevertheless how they are, in fact, handled is perhaps
12 better put to the men who are dealing with it in the
13 other panel.

14 MR. SNELSON: Yes.

15 MR. TRIVETT: Well, Mr. Hunter raised the
16 question of how do we do the comparison, but I think
17 we'll have to deal with that.

18 THE CHAIRMAN: Comparison between...?

19 MR. TRIVETT: Between one of these types
20 of generation and another type when you are dealing
21 with men -- presumably they have to do the comparisons.
22 There must be someone who is coming forward who can do
23 the comparison.

24 MR. SNELSON: Basically, the cost
25 estimate of each option carries with it an appropriate

1 share of overheads allocated to that option, and then
2 the cost of options are compared on the basis of the
3 total estimated cost of the option, cost of building,
4 the cost of overheads, the cost of all the other things
5 that go into it, and so on.

6 That comparison of options is done within
7 any particular technology group at the option panel
8 stage, and put together as plans, is done in Panels 10
9 and 11.

10 MR. TRIVETT: Q. And the cost overrun
11 allocations? To take the example of the Darlington
12 plant, which has now been rather longer in construction
13 than presumably the plan would have been.

14 MR. SNELSON: A. Yes.

15 Q. The costing of that and where it
16 should be allocated is also a question to go over to
17 the other panels really?

18 A. Yes. In estimating the costs of
19 future nuclear plant, then the cost records of the
20 actual costs of existing nuclear plants is one of the
21 primary sources of information that is used in
22 estimating the cost of future plant.

23 Q. Is this used in your comparison
24 between construction internally and having turnkey
25 operations outside? Because, presumably, if it's a

1 turnkey operation and the unfortunate chap who's doing
2 the job runs into the same problems, it's his headache,
3 not yours?

4 A. This is more of a decision that would
5 be made at the stage of implementing the option where a
6 decision was made to whether to design and build
7 ourselves or contract out some part of the
8 construction, possibly on turnkey basis.

9 The options panels could probably talk to
10 the risks associated with those various methods of
11 implementing the option. It's not necessarily a
12 decision that has to be made at this stage.

13 Q. Well, presumably we can come back to
14 these questions in dealing with the specific panels.

15 A. I think that would be appropriate.

16 Q. Are you familiar with the term
17 "decision analysis study"? Is that a procedure that's
18 gone through by your stage or later?

19 A. Decision analysis is a term that is
20 sometimes used for a variety of cost and risk studies.
21 I'm not sure what specific type you're referring to.

22 Q. In determining whether to use inside
23 or outside contractors.

24 THE CHAIRMAN: We're getting back into
25 using inside or outside contractors. That's definitely

1 a planning matter and that doesn't really touch on the
2 existing system, I wouldn't have thought.

3 MR. TRIVETT: I'm inclined to leave these
4 questions over, Mr. Chairman. I think those are all my
5 questions. Thank you very much.

6 MRS. FORMUSA: Before Mr. Trivett leaves,
7 his question with respect to ramp rates for thermal
8 units, at least, has been provided in supplementary
9 information to Interrogatory 2.14.9.

10 MR. TRIVETT: Thank you very much.

11 THE CHAIRMAN: I think, Mr. Kelsey, we'll
12 take the break now and then you can start after that.
13 You're the next up?

14 MR. KELSEY: Constance Marlatt will next.

15 THE CHAIRMAN: All right.

16 MR. KELSEY: I think she'll be quite
17 brief, and then I can start after.

18 THE CHAIRMAN: All right. Fine.

19 THE REGISTRAR: We'll recess for 15
20 minutes.

21

22 ---Recess at 3:25 p.m.

23

24

25

...

1 ---On resuming at 3:45 p.m.

2 THE REGISTRAR: Please come to order.

3 This hearing is again in session.

4 THE CHAIRMAN: Good afternoon, Ms.

5 Marlatt.

6 MS. MARLATT: Good afternoon, Mr.

7 Chairman, Members of the Board. I hope to be pretty
8 quick this afternoon. After all these days of cross
9 examination, I think my questions are fairly limited
10 and specific.

11 CROSS-EXAMINATION BY MS. MARLATT:

12 Q. Ms. Ryan, I believe my questions will
13 be directed to you. Just as a beginning, I'd like to
14 make sure we are working off the same chronology of
15 events, and I would ask you to turn to page 1-5 of the
16 DSP Report. And there is a table there with the
17 heading "The Development of the Demand/Supply Planning
18 Strategy."

19 MS. RYAN: A. Yes.

20 Q. I'd just like to you confirm, it is
21 my understanding that the process for the development
22 of the Demand/Supply Plan began in 1984. Is that your
23 understanding also?

24 MR. SNELSON: A. The Demand/Supply
25 Options Study, which preceded the Demand/Supply Plan,

1 was started about that time.

2 Q. In 1984.

3 A. Yes.

4 Q. Thank you. And public consultation
5 began in 1985 to 1986, is that correct?

6 A. Yes, that is the chronology there. I
7 believe it is correct.

8 Q. And in 1989, the Demand/Supply Plan
9 was released?

10 A. Yes, in late '89.

11 Q. I would then ask you to turn to the
12 State of the Environment Report, Exhibit 21, and that
13 is a 1989 report to page 91.

14 Ms. Ryan, I believe in your previous
15 testimony you have said that your environmental
16 division was responsible for putting together the State
17 of the Environment Report, is that correct?

18 MS. RYAN: A. For coordinating it.

19 Q. For coordinating, thank you.

20 I'd like to read in the following
21 paragraph. If you look at page 91, the third paragraph
22 down under the heading "Aboriginal Relations."
23 Actually, I'm sorry, it is the fourth paragraph, and
24 that paragraph states that:

25 "A committee of four vice-presidents

1 was established in 1989 to provide a
2 forum for addressing relations with
3 aboriginal people and to provide
4 corporate direction and coordination.
5 During the year, Ontario Hydro
6 commissioned a study of the consultation
7 and communication processes through which
8 it relates to aboriginal people. The
9 study identified many inadequacies in the
10 existing system and recommended possible
11 action for Ontario Hydro to take in
12 future consultation program."
13 Ms. Ryan, do you agree with that
14 paragraph?

15 A. Yes, it is my understanding that work
16 is underway to improve our communication with
17 aboriginal people.

18 Q. Can you tell me whether or not the
19 recommendations from this report, the consultation
20 report, have been implemented?

21 A. I believe it will be an ongoing
22 process, and there is work underway, but certainly it
23 is recognized that there are outstanding issues yet to
24 be resolved.

25 Q. Can you be more specific and tell me

1 what work is underway that you are aware of?

2 A. It is my understanding that as part
3 of the Moose River basin project, that there will be a
4 cumulative effect study carried out, and, in fact, that
5 the intent is to try and have the aboriginal people
6 that are affected by it participate in the early parts
7 of the project.

8 Q. You are not aware of any other
9 specific instances of this implementation?

10 A. In addition to that, my understanding
11 was that there are initiatives with respect to The
12 Little Jackfish development to get input from the
13 aboriginal people and address their concerns, and that,
14 in fact, some offers had been made to provide funding
15 for the early part of the projects.

16 In one case, with respect to the
17 Mattagami EA there, was an offer to fund a resource
18 study, but that was declined by the native people to
19 whom the offer was made, but my understanding is that
20 even though that didn't go through as we'd hoped, there
21 are still discussions underway.

22 Q. But that, of course, is part of the
23 Moose River Basin--

24 A. Yes.

25 Q. --Development. Thank you.

1 Now looking back to the paragraph that I
2 asked you about, the paragraph says that "...a
3 consultation study, commissioned in 1989 identified,"
4 and I quote "many inadequacies in the existing system."

5 You say that you agree with what this
6 paragraph had set out. What I would like to know, Ms.
7 Ryan, is what is your opinion? If the Demand/Supply
8 Plan was published in 1989, it must be fair to say that
9 these identified inadequacies must exist within the
10 Demand/Supply Plan that we have before us today.

11 A. I think it is fair to say that the
12 document that has been presented as the Demand/Supply
13 Plan, I look at as a starting point.

14 I think with our existing hydraulic
15 projects, which we have already discussed previously,
16 were constructed, many of them, in the early 1900s, the
17 environmental requirements, both the natural
18 environment and social environment, were much different
19 than they are today. I think construction practices
20 and the operation met the requirements of those days,
21 but I also think it is fair to say that there are some
22 residual effects that have not been resolved to the
23 satisfaction of everyone, and that we do have programs
24 underway to do that.

25 Perhaps things haven't gone as quickly as

1 we would like or as other people would like, but my
2 understanding is that there is progress being made, and
3 that progress, with the work being done on the specific
4 project environmental assessments, which go into more
5 detail, will be part of the input to this total
6 process.

7 Q. But, Ms. Ryan, I didn't ask you about
8 the project specific--

9 A. Okay.

10 Q. --process. What I'm interested in is
11 the Demand/Supply Plan Report that you have sitting
12 before you today.

13 A. Yes.

14 Q. That was published in 1989. In 1989,
15 an Ontario Hydro commissioned report said there were
16 "...inadequacies in the existing system for
17 consultation with aboriginal people."

18 A. Yes.

19 Q. Therefore, this report that you have
20 sitting in front of you must have some of those
21 inadequacies contained within it, assuming aboriginal
22 people were part of your consultation process in 1985
23 and '86?

24 MR. SNELSON: A. First of all, can I
25 tell you that some of the consultations took place,

1 which included aboriginal people, in the earlier
2 process, and during the Demand/Supply Option Study,
3 there was a number of consultation processes
4 undertaken. One of them was called the Provincial
5 Organization Consultation Program, and that program
6 invited comments on demand/supply planning issues from
7 a number of organizations that were organized across
8 the province, including some aboriginal groups.

9 The results of that process are
10 documented in Exhibit 60, which is Volume 1,
11 consultation process; Exhibit 61, which is Volume 2,
12 the summary of the submissions that were received; and
13 Exhibit 62, which is the full submissions by the
14 organizations. So, there are three exhibits which
15 discuss that consultation program.

16 Q. Thank you. But certainly, in 1989,
17 when this study was commissioned, this study came out
18 with a finding that there were inadequacies in the
19 existing system. Certainly prior to 1989, Ontario
20 Hydro must have recognized that there were serious
21 problems with their existing consultation process.

22 MR. TABOREK: A. But the consultation
23 process, the process of discussing the plan with people
24 not only involves the initial consultation that was
25 described, it involves a very lengthy report, it

1 involves thousands and thousands of interrogatories in
2 support of this document, it involves hundreds and
3 hundreds of exhibits, it involves months and months and
4 years and years of man effort and testimony, and it
5 will involve millions of dollars worth of support for
6 examination of it. And that whole process, I would
7 think, is probably the single-most intensive round of
8 consultation undertaken on a project, I would imagine.

9 Q. Well, thank you.

10 A. The fact we are sitting here is part
11 of it.

12 THE CHAIRMAN: I'm just a little behind.
13 Sorry, Mr. Taborek, I'm a little behind. I may have
14 missed this. This paragraph here refers to a study.
15 Is that study a document that we have?

16 "The study identified many
17 inadequacies in the existing system and
18 recommended possible actions for Ontario
19 Hydro to take in consultation programs."

20 Is that a document that we have?

21 MS. RYAN: It hasn't been filed as an
22 exhibit, no.

23 MRS. FORMUSA: It has been requested,
24 however, as a response to an interrogatory, I believe
25 on Panel 6 again, and I am not sure if the answer has

1 gone out, but I have seen the document, and it will be
2 appended to a response to that interrogatory.

3 THE CHAIRMAN: It would be a lot easier
4 to deal with this line of questioning if we had that
5 document.

6 MRS. FORMUSA: I don't recall whether the
7 document specifically addressed the DSP process or
8 addresses the consultation generally, but it will be
9 made available, if it is not already out in response to
10 that interrogatory. I can look up the number of that
11 interrogatory, if that is helpful, and provide a copy
12 of the report.

13 MS. MARLATT: Well, Mrs. Formusa, perhaps
14 you can tell me then, will Panel 6 be a panel that can
15 answer questions referring to that document?

16 MRS. FORMUSA: I believe Panel 6 will
17 have people on it who commissioned the study. If it is
18 not 6, I will let you know which panel, but we will
19 certainly have someone who can address that study and
20 consultation process.

21 MS. MARLATT: Thank you. But just to
22 explain, I meant my question to be quite specific with
23 regard to the State of the Environment Report, and that
24 report says in it, quoting from the consultation study,
25 that there were inadequacies in the existing system.

1 It was just at that level that I was asking the
2 questions, and certainly more detailed questions can be
3 asked of Panel 6.

4 DR. CONNELL: If I could just clarify my
5 understanding, Ms. Marlatt, it refers to deficiencies
6 in process. A deficient process does not necessarily
7 lead to a defective product. I think your question
8 seems to me to infer that that is the case.

9 MS. MARLATT: Well, I would imagine it is
10 the interpretation of my clients that a deficient
11 process, in their case, probably does lead to a
12 deficient product. Because if they are dealing on a
13 completely different wavelength when they ask questions
14 and receive answers, the answers cannot adequately
15 reflect what the community wants Ontario Hydro to
16 understand about that community.

17 DR. CONNELL: Right, but it should be
18 possible, if that is the case, for your client to
19 examine the defects in the product itself.

20 MS. MARLATT: Certainly. But what I
21 wanted to know from Ontario Hydro was that within their
22 own report in 1989, they recognize that there were
23 inadequacies, and yet in 1989 they also released the
24 Demand/Supply Plan, and certainly prior to 1989 they
25 had to have been aware that there were inadequacies in

1 the process.

2 It wasn't until 1989, when the
3 Demand/Supply Plan was released, that they commissioned
4 a study, instead of in 1984, when the process began.

5 THE CHAIRMAN: I don't know if we can
6 carry this very much farther than that until we see the
7 study, can we?

8 MS. MARLATT: Yes, that is fine with me.

9 Q. Ms. Ryan, I'd like to refer you to
10 Exhibit 19, which is your 1988 State of the Environment
11 Report.

12 MS. RYAN: A. Yes.

13 Q. In that report - and please correct
14 me if I'm wrong - but I can only find two references to
15 aboriginal people. One on page 60, and one on page 84.

16 Now 60, if you look on the heading,
17 "Initiatives," the second paragraph, the last sentence
18 states that:

19 "Native people at Little Jackfish are
20 cooperating in providing data on resource
21 use."

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...

1 [4:00 p.m.] And on page 84 there is, in the second
2 paragraph down, a short discussion about
3 Little Jackfish ending with:

4 "Discussions on future impact
5 management continued with local groups
6 including the Whitesand Indian band."

7 To your knowledge, are those the only two
8 references to aboriginal peoples in this report? If
9 you wish, Ms. Ryan, you can correct me if I am wrong.

10 A. I would assume that that is probably
11 correct and I think reflects the fact that we are now
12 trying to put more efforts into our aboriginal
13 relationships and that's why there is more on it in the
14 1989 report.

15 Q. Could you please elaborate on that?
16 What happened between 1988 and 1989 where you have a
17 full paragraph headed "Aboriginal Relations" that you
18 suddenly discovered aboriginal people? What happened
19 in that year?

20 A. I can't answer you specifically with
21 any given event.

22 Q. Ms. Ryan, would you agree with me,
23 though, that Ontario Hydro has interacted with
24 aboriginal people in the province for a large time
25 prior to 1988.

1 A. Yes.

2 Q. Thank you. I would like to go back
3 to the 1989 report, and on page 91 there is a reference
4 to a committee of four vice-presidents that was
5 established in 1989.

6 A. That's correct.

7 Q. This committee's purpose was to
8 provide a forum for addressing relations with
9 aboriginal people and to provide corporate direction
10 and coordination?

11 A. That's correct.

12 Q. Ms. Ryan, could you identify these
13 four individuals for me?

14 A. It would be the senior vice-president
15 of human relations, the vice-president of corporate
16 relations, the vice-president of region's branch, and
17 the fourth one just escapes me at the moment, I would
18 have to look it up.

19 Q. Perhaps you can let me know at a
20 further point in time.

21 Should we treat that as an undertaking or
22 can we get that this afternoon?

23 MRS. FORMUSA: I know that was one was
24 been provided in an interrogatory and I can give that
25 one as well.

1 MS. MARLATT: Thank you.

2 Q. Ms. Ryan, to your knowledge, are any
3 of these four vice-presidents of aboriginal ancestry?

4 MS. RYAN: A. They are not specifically,
5 no.

6 Q. Do you know whether or not any of
7 these individuals have ever lived on a reserve?

8 A. I don't personally know, no.

9 Q. Do you know if they have lived, any
10 of the four, ever lived in Northern Ontario?

11 A. I don't know that.

12 Q. All right. Is it within your
13 knowledge whether or not any of these four individuals
14 speak any aboriginal language?

15 A. I don't know that. I would doubt it,
16 but I don't know for sure.

17 MS. MARLATT: Thank you, Ms. Ryan. Those
18 are all my questions.

19 THE CHAIRMAN: Thank you, Ms. Marlatt.

20 Mr. Kelsey?

21 MR. KELSEY: Yes.

22 CROSS-EXAMINATION BY MR. KELSEY:

23 Q. Members of the witness panel, so that
24 you know, as they say, where I am coming from, I am
25 counsel for Northwatch. You may have read an article

1 in the Globe and Mail on Monday of Northwatch, where we
2 were described as representing a different lifestyle,
3 the sandles and long hair, and that kind of thing.

4 Well, we are doing our best to change that image, but
5 you can assume that you can colour us green. So, you
6 know where we are coming from.

7 Could I start with Ms. Ryan. Dealing
8 with your evidence in chief on the extent to which
9 Ontario Hydro treats the environment as a priority, you
10 said that - and if you wish to refer the transcript,
11 it's at page 2743 - and you indicated that four
12 criteria have been established within Ontario Hydro.
13 The first thing I want, the four criteria that you
14 refer to on that page, have they been set down in
15 writing?

16 MS. RYAN: A. Yes, they are established
17 in our policy on the environment.

18 Q. And has that policy been produced
19 here?

20 A. I don't think it was sent out with an
21 interrogatory.

22 Q. I just wondered, as you referred to
23 it in your evidence but didn't produce anything in
24 writing, I wondered whether there was something that
25 clearly set out the criteria and how they were applied.

1 A. Our corporate policy on the
2 environment does that clearly, and it will be part of
3 the 1990 State of the Environment Report, but that
4 hasn't been issued yet.

5 Q. Because I assume that it would be in
6 writing and that Ontario Hydro didn't have its own sort
7 of oral tradition.

8 Is that available, the criteria in
9 writing?

10 A. Yes.

11 THE CHAIRMAN: If it is available, would
12 you like it produced?

13 MR. KELSEY: I would like it, yes.

14 Q. Has it been published yet?

15 MS. RYAN: A. Internally, yes. The copy
16 I have was revised in 1984, so it was developed in the
17 early 80s.

18 Q. When was it first published?

19 A. When?

20 Q. Yes.

21 A. I don't have the date exactly. It
22 would be the early 80s that it was published.

23 Q. And did it go into effect in the
24 early 1980s? In other words, has it been in effect
25 since then, since the early 80s?

1 A. Yes. It is our policy entitled
2 "Environment."

3 Q. You say that the first criterion
4 "...is to meet the law as a minimum, or to do better
5 where we can." What does that mean, "where we can"?

6 A. I guess the one thing I should point
7 out is that my direct evidence was paraphrased; it's
8 not the exact wording of the policy. I can read you
9 that, if you would like.

10 Q. If you would. What are you reading
11 from?

12 A. My notes, which is a copy of our
13 policy on the environment.

14 Q. Is that available here at the moment?

15 THE CHAIRMAN: Is this a document that
16 you reading from?

17 MS. RYAN: No.

18 THE CHAIRMAN: Or is it something that
19 you prepared yourself?

20 MS. RYAN: It's a copy of the policy on
21 the environment taken from our corporate policy
22 document.

23 MRS. FORMUSA: So, we can provide that.

24 MS. RYAN: Yes.

25 THE CHAIRMAN: And so what you are

1 reading is word for word what is in it, is that right?

2 MS. RYAN: Yes.

3 MR. KELSEY: Q. It's strictly an
4 internal document, is it, up until now? You said it
5 was going to be published in the 1990 State of the
6 Environment Report.

7 MS. RYAN: A. For information, but it's
8 an Ontario Hydro policy on the environment. It's our
9 corporate policy.

10 Q. So, it is a public document.

11 A. It's a public document.

12 Q. Fine. Would you read then, before I
13 see it, would you read your note of what it says?

14 A. Sure. The first decision rule is
15 that:

16 "Ontario Hydro shall meet all
17 requirements of environmental legislation
18 and will seek ways of developing more
19 appropriate standards wherever
20 practical."

21 Q. So, instead of "where we can," it's
22 "wherever practical," is it? Is that the word of the
23 policy?

24 A. Yes.

25 Q. What does a mean?

1 A. That means that when you take into
2 account the other factors, such as safety, cost,
3 reliability, and you balance them, that it's practical.

4 Q. So, does that mean that you look at
5 the three criteria and if the application of those
6 criteria allow it, then you go back to No. 1 and say,
7 okay, we can perhaps better the law; is that what you
8 mean?

9 A. I think on a case-by-case basis each
10 example would be taken and evaluated according to the
11 criteria of the project and the other factors such as
12 cost, and a decision reached by the manager responsible
13 for that project on the appropriate balance.

14 Q. Applying the other three criteria you
15 mean?

16 THE CHAIRMAN: The other three being
17 safety, cost and reliability?

18 MR. KELSEY: No.

19 THE CHAIRMAN: There may be a mixing up
20 of criteria here.

21 MR. KELSEY: That's right. We have got
22 two separate things.

23 Q. We have got, on page 2743, you say,
24 there is first of all a balancing of number of factors,
25 environment is one of them. And then there is cost

1 reliability and safety. In order to achieve that
2 balance, the four criteria listed, and the first one is
3 the one that I have indicated, the second one is to --
4 and these are all environmental criteria, the next one
5 is to minimize adverse impact where there are no
6 regulations, the third one is to consider offsetting
7 the benefits where there are significant adverse
8 impacts, and the fourth one is to play a lead role in
9 environmental control technology development and use.

10 So, those are the four criteria in the
11 context of the environment.

12 MS. RYAN: A. That's right. And they
13 have been paraphrased.

14 Q. And the environment is one of the
15 four factors that affect the environment in Ontario
16 Hydro's total activities?

17 A. Yes. Environment is one of the four
18 factors, or one of many factors.

19 Q. So, when you say then either where we
20 can or where it's practical, do you mean in the context
21 of applying the three factors referred to above, cost,
22 reliability, safety?

23 A. In addition to other factors they are
24 three examples of the more major ones.

25 Q. What are the others?

1 A. It would depend on a specific
2 project, public input, other factors such as that.

3 Q. So, going back then to what I just
4 asked, where we can or where practical is after
5 considering and applying the factors of cost
6 reliability, safety, and once those have been applied,
7 then what is left over describes, or boundaries, the
8 area that Ontario regards as it being practical to meet
9 a better standard than the law requires; would that be
10 the case?

11 A. To deal with it in general terms is
12 quite difficult because there are specific areas for
13 specific reasons where we do more and it will cost
14 more.

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1 [4:15 p.m.] So, to make a general statement like that
2 is not possible.

3 Q. All right. We're taking a specific
4 example.

5 A. Sure.

6 Q. One that affects me.

7 A. Okay.

8 Q. I can tell you how. Herbicides.

9 A. Yes.

10 Q. Near where I live there is a Hydro
11 right-of-way leading from the Pickering plant through
12 Highland Creek, crosses Highland Creek, and I go
13 through this right-of-way every day to take my dog for
14 a walk down Highland Creek.

15 And I went there last weekend, and there
16 were signs on the right-of-way, red ones, indicating,
17 "Don't use this right-of-way. Herbicides have been
18 used." And on the back it indicated what herbicide,
19 and it said "Killex 500."

20 My dog eats grass, so I thought maybe
21 it's not a very good idea to take my dog there. And
22 also there was nobody there. This is a built-up area
23 in the city; right?

24 Now, the right-of-way is not that broad.
25 It's a main transmission corridor, but it's not that

1 broad. It's used by a lot of people.

2 Now, using the principal of where we can
3 or where practical, would it not be possible and
4 practical and quite easy in that context in a right-
5 of-way that is in common use by people not to use
6 poison?

7 A. Certainly your concern is the reason
8 that we are, in fact, reducing our herbicide reduction.
9 The use of the word "poison," if it's applied properly,
10 I have some difficulty with that in the absolute. But
11 certainly that type of area would be the type of area
12 being looked at for reduction because of public
13 concern. I don't know the specifics of the alternative
14 uses there to comment specifically.

15 Q. Would you say that it's, in 1991,
16 acceptable to Ontario Hydro to have - and it is
17 poison - on rights-of-way in built-up areas where there
18 are people walking barefoot and exercising their dogs,
19 is that acceptable in 1991 to Hydro as part of its
20 existing system?

21 A. I guess the other alternative is to
22 not let people on the right-of-way, and it's a balance
23 of those two things.

24 Q. Is the answer yes on that?

25 A. I guess yes, with qualifications.

1 Q. So it is acceptable?

2 A. With qualifications.

3 Q. But you would agree with me that
4 there is nothing preventing Hydro from using an
5 alternative environmentally friendly method of
6 controlling weeds on this right-of-way?

7 A. To the extent that environmentally
8 friendly methods exist and are practical for use, yes.

9 Q. Well, isn't it a result of applying
10 ahead of environmental considerations the factors of
11 cost, the factor? Because we're not concerned with
12 reliability or safety in this context, are we? Aren't
13 we concerned just with cost?

14 A. Depending on the method of control,
15 there might be a worker-safety question, but --

16 Q. Well, there clearly is, because if
17 the aim of Hydro in the future is to reduce the use of
18 herbicides, then there must be an alternative, isn't
19 there?

20 A. Yes, there are alternatives, manual
21 alternatives, for brush-cutting and that sort of thing.

22 Q. And that involves employing people?

23 A. It involves employing people and it
24 involves heavy cutting equipment, and I don't think --
25 there are evaluations going on right now to balance

1 lowering the use of herbicides versus a more manually
2 intensive technology that may lead to higher worker
3 safety problems.

4 Q. There's no problem in employing men,
5 people, is there? Lots of people to employ?

6 A. Oh, certainly.

7 Q. And there's lots of equipment around?

8 A. There is equipment.

9 Q. Yes. All right. Another example,
10 one example, are you familiar your with Kakabeka Falls?

11 A. I know roughly where it is. I'm not
12 that familiar with it.

13 Q. It's 30 kilometers west of Thunder
14 Bay.

15 A. Yes.

16 Q. There is a reference in - let me just
17 find it - the 1989 State of the Environment Report
18 under "Hydraulic." It's in the context of, again, a
19 balancing of factors. It's page 63 of the 1989 report.
20 Sorry. 63.

21 A. 63, yes.

22 Q. In the context of water level
23 management.

24 A. Yes.

25 Q. And these are the second largest

1 falls in the province after Niagara.

2 I agree with the statement that they are
3 scenic. But part of the beauty of this bluff and the
4 useability is the flow of water over the falls.

5 And you have in the last sentence or the
6 last paragraph of this section, water level management,
7 Ontario Hydro says in its report:

8 "In 1989 Ontario Hydro joined with
9 local Ministry of Natural Resources and
10 Ministry of the Environment districts in
11 the Lakehead Region Conservation
12 Authority to form a water quantity
13 committee for the Kaministikwa River.

14 The commitment will study and reconcile
15 the water quantity demands being placed
16 on the river."

17 Now, does Hydro give priority on these
18 falls to its own water quantity demands?

19 MR. SNELSON: A. I could point out to
20 you that the Kakabeka Falls plant was built from 1906
21 to 1914. So, we're talking about a plant that has been
22 in place for a long period of time.

23 Q. Yes, I know. It actually came in
24 operation in 1910 and it's, I agree, it's relatively
25 small. It's 16 megawatts?

1 A. According to our data it's 17
2 megawatts.

3 Q. 17?

4 A. 17.

5 Q. Right. Yes. 16.9, I believe it is.

6 And how is that relevant?

7 A. Only that the use of water for
8 hydro-electric generation in that location is a
9 long-standing use. It's only in that context that I
10 thought it might be relevant.

11 Q. What are competing water demands
12 there or water supply demands?

13 MR. BARRIE: A. Well, at Kakabeka Falls
14 there is trade-off between the amount going over the
15 falls, which is essentially a spill, as far as we're
16 concerned.

17 Q. A spill?

18 A. Yes. We aren't using it for
19 electricity generation.

20 THE CHAIRMAN: As opposed to using it for
21 what else?

22 MR. BARRIE: It either goes over the
23 falls or it goes through our generating units.

24 THE CHAIRMAN: So, you have no reservoir;
25 is that what you're saying?

1 MR. BARRIE: There is a reservoir. The
2 units are in parallel, if you will, with the falls.
3 It's really the same situation as you have it in
4 Niagara Falls. All the water that goes over the falls
5 we can't use for electricity generation.

6 There is another environmental --

7 MR. KELSEY: Q. The spill is the extra
8 water that isn't used?

9 MR. BARRIE: A. Right.

10 Q. Right. Because the generating plant
11 is down river?

12 A. There is an extra environmental
13 consideration in the operation there. There's a
14 minimum flow downstream of 17 cubic meters per second
15 for pollution control purposes.

16 Q. Yes?

17 A. So, it's that, plus all the other
18 factors that are taken account of when these groups get
19 together, including Ontario Hydro in deciding the
20 appropriate operation of the plant.

21 Q. What are the other water quantity
22 demands then, other than pollution control at Ontario
23 Hydro?

24 In other words, what I'm asking is: Is
25 any consideration given in determining this question to

1 the essential environmental matter which, to me, is the
2 fact, as is pointed out there, that the flow over the
3 falls has been substantially and significantly lessened
4 certainly since the end of the 19th century when it was
5 used as the main water course out west to Fort Gary and
6 up into the beginning of the 20th century before the
7 generating plant was placed there.

8 Does Ontario Hydro regard that, the
9 original water flow over the falls, as an environmental
10 consideration?

11 A. Yes.

12 Q. Yes? And how does it take it into
13 account then as a water quantity demand?

14 A. It's a balance that has to be struck.
15 I can't give you the exact quantities, but it's a
16 balance that's struck in discussion between Ontario
17 Hydro and everyone else involved in that area between
18 agreeing on a minimum amount that should always go over
19 the falls.

20 Q. Is there an agreement or a document
21 that establishes that? I see there is reference to
22 discussions with Natural Resources and Environment.
23 Has there been anything in writing as a result?

24 Because it just says the committee will
25 study and reconcile. I wondered if anything had, in

1 fact, yet been done by 1991 in that respect, seeing
2 that the plant's been there since 1906?

3 MS. RYAN: A. I don't know whether there
4 has been.

5 Q. Could you make an inquiry, and if
6 there is something, could you produce it, please?

7 MR. BARRIE: A. I can assure you that
8 the people coming on Panel 6 could give you tremendous
9 detail on the operation of this plant that I'm unable
10 to give you because it's not large in the provincial
11 context for power generation. But the hydraulic
12 experts on Panel 6 I'm sure could give you a lot better
13 answer than I.

14 Q. That's true. It's just that I was
15 asked for a specific -- or it's difficult to deal with
16 the general criteria in the absence of a specific, so I
17 gave a specific.

18 I think the next question is for Mr.
19 Barrie in relation to operational planning. Your
20 evidence on page 2776 where you make the distinction
21 between generation, schedule planning and -- between
22 operational planning and real time operation?

23 A. Yes.

24 Q. Resulting in a generation schedule
25 plan.

1 A. Yes.

2 Q. Again we have four objectives, four
3 criteria. Four seems to be the magic number. The
4 first one you indicated was to minimize overall
5 production costs. The second one, respect internal
6 system constraints. The third one, to respect the
7 environmental concerns, and, fourth, to ensure reliable
8 supplies to customers.

9 The generation schedule plan is, I guess,
10 a daily one, isn't it?

11 A. Yes.

12 Q. But I assume that there are documents
13 or plans or policies that come before that that
14 influence or determine how each daily generation
15 schedule plan is arrived at?

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...

1 [4:28 p.m.] A. Yes, for each type of generation,
2 there are constraints upon the generation which go
3 before the plan.

4 Q. No, I know. Yes, but I'd like, first
5 of all, to understand the process and how, as a matter
6 of policy, or what principles you use to arrive at the
7 daily generation schedule plan, just in terms of
8 process, not content. In other words, what do you look
9 to in formulating your daily generation schedule plan?
10 I mean, you just don't have these sort of four basic
11 things in mind, because it is a lot of staff. There
12 must be something that tells staff or directs staff in
13 how to produce that generation schedule plan, isn't
14 there?

15 A. Well, the overall plan, as I say, is
16 driven by the desire to minimize costs. So, if you
17 will, what goes before is the known cost of each type
18 of generation.

19 Q. So, No. 1 is cost.

20 A. I think I put it first because it is
21 the driving force for the way the different kinds of
22 generation are used. In the absence of any other
23 constraints being put upon it, the computer program
24 that puts this together will tend towards minimizing
25 cost.

1 Q. Would you agree that after cost would
2 come reliable supply?

3 A. It is not a question of what comes
4 first. I have said the computer program will drive
5 towards minimum cost. What comes first is the
6 constraints that are written in first, and reliability
7 constraints, environmental constraints and internal
8 system constraints, actually go in before minimizing
9 cost.

10 Q. Well, that is what I was asking
11 about, where those constraints come from. There must
12 be a policy before that indicates how you arrive at
13 your daily schedule, and I'm asking, what is that
14 contained in? How do we know what it is?

15 A. Well, we have mounds of documents
16 called operating policies, procedures and guidelines,
17 which lay out how a certain plant can be used, what you
18 should be striving to do in all of these areas. So, on
19 reliability, there is a policy that tells you how much
20 generation you should have on to both meet the demand
21 and provide the reserve that is required.

22 On an environment, there will be specific
23 limits written in for how high and low you can draw the
24 reservoir levels, how much energy one can use from our
25 peaking plant, that kind of thing.

1 On system constraints we have
2 minimum/maximum loading rates, shut down times and
3 things like that. So, they are all done ahead of time
4 and are written up in policies and procedures. Is that
5 the kind of thing...

6 Q. Is there one for each plant or one
7 for each type of generation?

8 A. There are different kinds. There are
9 some which are broad policies which apply across the
10 board.

11 Q. That is what I'm interested in.

12 A. Okay.

13 Q. Because they wouldn't be massive,
14 would they? They'd be fairly succinct, because they
15 come first, and then they are translated into specifics
16 for each plant, and then those specifics are translated
17 into a daily generation schedule, presumably.

18 A. Well, a general policy is the first--

19 Q. Yes, a general policy.

20 A. --one I mentioned. Well, there are a
21 number of general policy areas. The first general
22 policy, if I could mention, is a policy for how much
23 generation we should have on to meet the system peak
24 and how much peak approximately we have. That doesn't
25 relate to any one kind of generation, it relates to the

1 whole system.

2 We have transmission constraints, we have
3 an overall policy that we have agreed with our
4 neighbors on the North American Electrical Liability
5 Council that we will meet certain security criteria.

6 So again, that applies across the board. So, there are
7 a lot of these policies defining all different areas.

8 Q. Do they all at any stage come
9 together, or do they all start at different points and
10 just proceed along parallel lines and then somehow
11 converge?

12 A. They all come together in our
13 operating policies and procedures, which we have a set
14 of standardized proceedings.

15 Q. Okay. Well, it is not so much the
16 specific, obviously, operating procedures that I'm
17 interested in, but I am interested in the general
18 policies. Now, are they available? Can I see those?

19 Because presumably those will tell us
20 Hydro's thinking on its priorities, and specifically in
21 this context, how it ranks the environment as a
22 priority and as a consideration, how important it
23 values the environment, won't it? And then that will
24 be ultimately reflected on a daily basis, so that
25 each--

1 A. Right.

2 Q. --day each generation schedule will
3 tell us, we will know how the environment is being
4 respected, conserved, protected, harmed, right? That
5 is what I'm interested in.

6 A. Okay. Well, specifically on
7 environmental policy, as far as it affects operating.

8 Q. Well, environmental policy, but I'd
9 also need to know the others as well and how they all
10 fit together. So, what I'd like are the production of
11 the general policies.

12 A. I don't think we have a single
13 document that would lay out the policy in all areas.
14 We have numerous policies which, taken together, form
15 our overall operating policy.

16 Q. Could they be produced? The best
17 thing may be, obviously, it is not going to be possible
18 to do it now or tomorrow, and it may well be better
19 dealt with in detail at one of the planning panels
20 later on?

21 A. Well, if you are talking about
22 operating policy, I would rather deal with operating
23 policy, but...

24 Q. Or are they going to be bypass?
25 Pardon?

1 MRS. FORMUSA: We have provided some of
2 the PPGs, as they are called, in response to some
3 specific interrogatories.

4 THE CHAIRMAN: PPGs, what does that stand
5 for?

6 MRS. FORMUSA: The policies, procedures
7 and guidelines. It is a short form that would be at
8 the bottom of the sheet, and you will see in response
9 to some of the interrogatories, the answers on the
10 sheet called the Operating Policy and Procedure Guide.
11 The customer interruptible loads, I believe, will be
12 provided--

13 MR. BARRIE: Yes.

14 MRS. FORMUSA: --the operating policy and
15 procedure to that. So, we have done it in respect to
16 specific questions, but it is a lot of material, as I
17 understand it, and I'm--

18 THE CHAIRMAN: I guess the first
19 question--

20 MRS. FORMUSA: --trying to be helpful.

21 THE CHAIRMAN: --would be to try and
22 inquire whether there is a meaningful distinction
23 between what Mr. Kelsey refers to as broad policy
24 considerations, and specific criteria on day-to-day
25 operations. Is there such a distinction?

1 MR. BARRIE: I'm not sure that I know of
2 a document that would be in Mr. Kelsey's description.
3 I know of specific policies relating to the various
4 operating issues, one which is very...

5 MR. KELSEY: Well, the word specific
6 policies, but of a general nature. Specific in the
7 sense that they deal with one subject matter. General
8 in the sense that they lead to specific operating
9 principles, and it is those general specific policies
10 that I am interested in; general policies on specific
11 subject matters.

12 MR. BARRIE: Yes, it would be two
13 documents about the size of this.

14 MR. KELSEY: The first statements of
15 policy.

16 THE CHAIRMAN: But these are documents
17 that you can put your hands on?

18 MR. BARRIE: Yes. If we want -- they
19 amount to two documents about the size of this binder.

20 MR. KELSEY: Yes. Because the difficulty
21 I have, of course, that these emerge through the
22 evidence in chief, and they are condensed into two
23 pages of testimony, and it is very difficult to test
24 this testimony without looking at the documents.

25 THE CHAIRMAN: Well, it is two pages of

1 testimony supplemented by several thousand pages of
2 testimony after that, which various other specific
3 aspects have come out, but...

4 MR. TABOREK: Mr. Chairman, a document I
5 believe that particularly meets Mr. Kelsey's needs is
6 in the exhibits, and we are looking for it, but it is
7 the document that we submitted to the government,
8 lieutenant governor in council, to describe to them how
9 we would meet the acid gas limits that were imposed on
10 us, and it contains a basic policy statement, a
11 strategy. It contains methods by which we will carry
12 out that strategy, and gives cost estimates and
13 predictions of performance.

14 THE CHAIRMAN: I'm not sure that I'm on
15 the right wavelength, because I thought that what Mr.
16 Kelsey was talking about was what guides the day-to-day
17 people who operate the system.

18 MR. KELSEY: Really, what lies behind Mr.
19 Barrie's statement that in formulating the plan, the
20 staff have four objectives. Now where are those four
21 objectives, either stated or embodied in?

22 MR. BARRIE: They are embodied in our
23 policies, procedures and guidelines manuals.

24 MR. KELSEY: Well, I guess that is what
25 I'd like.

1 MRS. FORMUSA: I guess I'm questioning
2 the efficiency of producing the materials. I mean, if
3 we are...

4 THE CHAIRMAN: Well, maybe a compromise
5 would be to let Mr. Kelsey, or someone on his behalf,
6 have a look at them, and then if there are certain
7 extracts that needed to be produced from it, they could
8 be produced. That might be a practical way of doing
9 it.

10 MRS. FORMUSA: I think that would be more
11 effective. Why don't we do that? We will arrange with
12 Mr. Kelsey to show him the binders.

13 MR. KELSEY: Thank you.

14 MRS. FORMUSA: Start from there.

15 MR. KELSEY: Sure.

16 Q. The question is perhaps directed to
17 you, Mr. Barrie. The elements that go into these
18 policies, of course, are matters of choice and
19 judgment. In other words, Ontario Hydro is free to
20 choose among these various considerations and criteria.
21 There are none that are determinative.

22 MR. BARRIE: A. Well, we are normally
23 incorporating some corporate position into what that
24 means in terms of real time operation. So, what Hydro
25 chooses is at the corporate level. We are responding

1 at the corporation's objectives.

2 Q. Right. How you operate on a daily
3 basis--

4 A. Right.

5 Q. --depends on the choices and
6 judgments that have already been made higher up,
7 further back.

8 Would you agree with me that those
9 choices are matters of judgment, not science?

10 A. You are getting beyond an area which
11 I think I should comment on.

12 Q. But an area that you did comment on
13 at page 2784 of your evidence in chief at the top, you
14 said:

15 "Environmental considerations affect
16 operations in that they sometimes cause
17 us to move away from the scheduling
18 program based purely on economics."

19 That would seem to indicate that cost
20 comes first, and where there are sometimes other
21 considerations, you will take the environment into
22 account. Would that be a fair summary?

23 A. That would be a very strange way to
24 put it.

25 Q. Well, how would you put it that

1 wouldn't be strange?

2 A. As far as we are concerned,
3 environmental constraints are given to us as a set of
4 constraints that must be respected. So, they'd come
5 first in that context.

6 Q. When you use the word constraint,
7 do you use it in the sense that it is a limitation on
8 your activities?

9 A. Yes.

10 Q. The environment seems to be the only
11 context in which you use the word constraint.

12 A. No, in fact, we regard the
13 environmental constraints in a similar fashion to the
14 way I would regard a transmission constraint, a
15 security constraint on the power system. It is
16 something that must be obeyed. However, having obeyed
17 it, you have satisfied the criteria, and then you will
18 strive towards minimizing cost.

19 Q. But I do suggest that cost, according
20 to what you say, comes first, and then you sometimes
21 move away.

22 A. You don't want to reiterate what I
23 just said?

24 Q. No.

25 And when you speak of cost, of course,

1 Ontario Hydro speaks of cost, you speak of the money
2 that Hydro directly puts out, including what it defines
3 environmental cost, which is the cost of environmental
4 measures, but that is all, is that right?

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1 [4:45 p.m.] A. In the context of the generation
2 schedule plan, I am talking about cost in terms of
3 dollars, yes.

4 MR. KELSEY: I am moving into another
5 area, and I am quite willing to begin in that area. I
6 probably won't finish it, but I am in your hands as to
7 whether you wish me to start it.

8 THE CHAIRMAN: Why don't run for fifteen
9 minutes and then stop.

10 MR. KELSEY: Certainly.

11 Q. You were asked, and I think this was
12 Ms. Ryan, you were asked by Mr. Shepherd, acting for
13 IPPSO, about what Ontario Hydro would do if it were
14 faced with, or in dealing with, a radical change in the
15 direction of environmental regulation. Do you recall
16 that? It's page 3999 of the transcript.

17 THE CHAIRMAN: Could you give me the
18 volume number, for convenience?

19 MR. KELSEY: Yes, 23.

20 THE CHAIRMAN: Thank you.

21 Q. Ms. Ryan, you said in response on
22 page 4000, you referred to sustainable development and
23 you said that you talked to Mr. Rothman from Panel 1 on
24 the question and that it was his view, with which I
25 assume you agree:

1 "....that we haven't seen a government
2 commitment to sustainable development,
3 and if we did, that would be a radical
4 break from the past. Those were his
5 words, radical break."

6 Sorry, this isn't a question, this is Mr.
7 Shepherd. And you said in your answer:

8 "I think with the example of
9 sustainable development, that is a
10 concept that governments and industry in
11 general are still grappling with as to
12 what does it mean to us in our planning
13 for the future, and I don't think anyone
14 has come to an end point definition."

15 Do you recall that?

16 MS. RYAN: A. Yes.

17 Q. Well, Ontario Hydro has accepted the
18 principle of sustainable development; has it not?

19 A. Yes.

20 Q. Completely.

21 I assume that we can take the State of
22 the Environment Report for each year as an official
23 statement of Ontario Hydro policy?

24 A. Yes.

25 Q. And that what it says it meets in it?

1 A. Yes.

2 Q. Would you look at the State of the
3 Environment Report for 1989, Exhibit 21, page 1.

4 A. Okay.

5 Q. The second last paragraph on page 1,
6 leaving aside the first sentence, says that:

7 "Ontario Hydro, by endorsing the
8 principle of sustainable development, has
9 recognized that the future economic
10 security of this province depends on the
11 maintenance of a viable environmental
12 base. Only through the careful balancing
13 of environmental and economic costs can
14 the residents of Ontario benefit most
15 from their utility."

16 Before I ask about sustainable
17 development, where it says there environmental costs,
18 what is it referring to?

19 A. It would be referring to costs to the
20 environment broadly, I guess including environmental
21 spending and broader costs.

22 Q. It would seem to me anyway to
23 indicate it means the cost to the environment.

24 A. Yes.

25 Q. The economic costs are the costs to

1 Hydro and the environmental costs are the costs to the
2 environment.

3 A. Yes, that's what it says.

4 Q. Well, if it's also, though, in
5 practice, if it's Hydro's practice not to put a dollar
6 value on the environmental costs, how is that balancing
7 carried out?

8 MR. TABOREK: A. Perhaps I can give you
9 an example.

10 Q. Yes.

11 A. In the case of acid rain, the federal
12 and provincial governments were taking action in the
13 late 70s and the early 1980s. The federal and
14 provincial governments dealt initially with the
15 provinces Manitoba and west. They made assessments of
16 the environmental damage that was being done. They
17 also made assessments of how much in the way of overall
18 reductions were required to affect those, to reduce
19 that damage.

20 They spoke to the companies who were
21 releasing emissions, including Hydro. They obtained
22 data from them on the costs of various levels of
23 reductions at each company. They determined, in
24 effect, how they would meet what they felt to be an
25 initial safe target in a least-cost fashion, taking

1 into account the flow of pollutants from one source to
2 one sensitive area. And having determined that, they
3 also determined that it was necessary -- it was only
4 feasible if those reductions could be obtained at the
5 same time as reductions in the U.S., and they put in
6 place a two-part program, one to negotiate an
7 understanding, a treaty with the U.S. to attain
8 reductions in the U.S., and in Canada they imposed
9 limits on each province, roughly a 50 per cent
10 reduction in our SO(2) emissions in Canada, and they
11 capped them in perpetuity. The provinces then
12 allocated those reductions to the various SO(2) sources
13 in each province, again using a least-cost approach.

14 In our instance we were allocated
15 reductions in stages that took us down by about 60 per
16 cent from our peak 1982 emissions.

17 And then our task was then, having been
18 given the direction from the government as to the
19 direction they wished to go, to implement a program to
20 meet it. And I then referred you to a document which I
21 believe is an exhibit in which we -- Exhibit 41, which
22 is in the context of this overall government action in
23 which we laid out our policy, our strategy, the
24 alternatives available to us, the particular
25 alternatives we would use in various circumstances, in

1 these sort of the uncertainties that would face us, and
2 we outlined the cost and we outlined a program of
3 something that will ultimately cost \$3-billion by the
4 year 2000, in which we would carry out our share of
5 this overall program.

6 It had occurred to me as you were using
7 words "radical redirection," I don't know how strong
8 the word "radical" is, but this was a very significant
9 program in that it was both an international program
10 between ourselves and the U.S., and it was both a
11 federal and provincial program, it spread across
12 boundaries, and a very major program on us to meet a
13 very challenging environmental target.

14 And I would also offer you the curve of
15 our actual performance over the past ten years which
16 Ms. Ryan produced in her direct evidence, to show that
17 we have been within the limits imposed on us, and we
18 have managed that while producing a great deal more
19 electricity than when we started in 1981, and reducing
20 our emissions and keeping costs to a reasonable level.

21 Q. So you would put that forward as an
22 example--

23 A. Yes.

24 Q. --of an answer to the questions that
25 Mr. Shepherd asked about what Ontario Hydro would do

1 when faced with a radical change in the direction --

2 A. I believe I did qualify on that.

3 Q. Just Let me finish the question.

4 A. I'm sorry.

5 Q. --when faced with a radical change in
6 direction of environmental regulation?

7 A. And I did, in my comment now, just
8 qualify radical. It may mean different things to
9 different people. Innovative perhaps.

10 Q. And would it be put forward as an
11 example of Ontario Hydro's commitment and acceptance of
12 the principle of sustainable development?

13 A. I can't answer that. I don't know.

14 Q. Ms. Ryan?

15 MS. RYAN: A. Certainly anything that
16 heads in the direction of reducing emissions would be
17 in the direction of sustainable development.

18 I think the point I was making to Mr.
19 Shepherd was there is a big difference between
20 accepting a concept in principle and being able to
21 define exactly what that means for day-to-day business,
22 and that is where we are at now in trying to define
23 what it means to business and how decision-making can
24 be made in that direction.

25 But I don't look at sustainable

1 development as an end point; I look at it as a
2 direction. And I think the best that we can do right
3 now is make sure we are going down the right path, and
4 I believe we are headed in that direction.

5 Q. But we aren't clear that Ontario
6 Hydro is not just grappling with it but it has accepted
7 clearly the principle.

8 A. Yes.

9 Q. And that is a step.

10 A. Yes.

11 Q. Fairly radical step for Ontario
12 Hydro.

13 I don't want to play with words.

14 All right, significant. Important?

15 A. It is a very important step, yes.

16 Q. I see. Because I think that we have
17 got to accept that the existing system has grown up in
18 a completely different atmosphere and reflects values
19 that are completely inconsistent because they are in
20 the past, completely inconsistent with a sustainable
21 future or sustainable development; do you agree with
22 that?

23 A. We have an existing system which is
24 being changed to conform to the concept of sustainable
25 development.

1 Q. It wasn't quite what I asked.

2 I said the existing system is the product
3 of quite different values.

4 A. Yes, by definition of when it was put
5 in place.

6 Q. Yes. As Mr. Snelson explained, the
7 Kakabeka Falls plant, it's 1906, 1910, so it reflects
8 basically the priorities at that time.

9 A. Certainly, yes.

10 Q. So presumably Ontario Hydro is now
11 contemplating a future that no longer has the values
12 that have formed the present system.

13 A. I would say some of the values are
14 still there but they are changing.

15 MR. SNELSON: A. The values have changed
16 over the development of the system quite significantly
17 and Ontario Hydro has responded to changing values in
18 the development and management of the existing system.

19 Q. And I guess our job here is to find
20 out to what extent.

21 THE CHAIRMAN: Perhaps with that high
22 note, we could end the day. (laughter)

23 MR. KELSEY: I hope it's not a low point.
24 (laugher) Thank you.

25 THE CHAIRMAN: Do you have any idea how

1 much longer you will be, Mr. Kelsey?

2 MR. KELSEY: I would say the outside, the
3 break, and I hope earlier. By the break anyway
4 tomorrow.

5 THE CHAIRMAN: And Ms. Couban, you are
6 next and last, I believe.

7 MS. COUBAN: Yes, I am. Less than an
8 hour hopefully, Mr. Chairman.

9 THE CHAIRMAN: Thank you.

10 We will adjourn until tomorrow morning at
11 ten o'clock.

12 THE REGISTRAR: This hearing will adjourn
13 until ten o'clock tomorrow morning.

14 ---Whereupon the hearing was adjourned at 5:00 p.m. to
15 be resumed on Thursday, June 13, 1991, at 10:00 a.m.

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